PATENT ABSTRACTS OF JAPAN

(11)Publication number : **10-214067**
(43)Date of publication of application : **11.08.1998**

(51)Int.CI. G09G 3/36
G02F 1/133
G02F 1/133

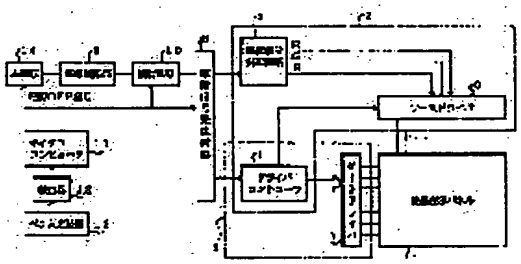
(21)Application number : **09-206840**
(22)Date of filing : **31.07.1997**

(71)Applicant : **SHARP CORP**
(72)Inventor : **KANBE MAKOTO**
ITOU YASUTAKA
YOSHIDA SHIGETO
YONEDA YUTAKA

(30)Priority
Priority number : **08315309** Priority date : **26.11.1996** Priority country : **JP**

(54) ERASING DEVICE OF LIQUID CRYSTAL DISPLAY PICTURE AND LIQUID CRYSTAL DISPLAY DEVICE WHICH IS PROVIDED WITH THE ERASING DEVICE

(57)Abstract:
PROBLEM TO BE SOLVED: To quickly erase after image and to suppress the deterioration of liquid crystals(LC) by conducting a full surface turned on operation for liquid crystal display(LCD) panel with an LC saturation voltage while providing power from a panel power holding means and then, conducting a full surface turned off operation.
SOLUTION: An auxiliary power supply 10 is turned ON by inputting a main power supply OFF signal and supplies power for the operations of an LCD panel 1 in lieu of a main power supply 14 for a certain period. A driving signal generating circuit 8 receives power from the supply 10 and generates composite video signals in which the panel 1 is full surface turned on for a certain period, that is longer than one vertical period, by an LC saturation voltage and the signals are outputted to a source driving section 2 and a gate driving section 3. Then, the panel 1 is full surface turned on for more than one vertical period. Moreover, the circuit 8 generates the composite video signals, which full surface turn off the panel 1 for a certain period, and outputs the signals. Thus, the panel 1 is full surface turned off for longer than one vertical period.



LEGAL STATUS

[Date of request for examination] 21.07.2000
[Date of sending the examiner's decision of rejection]
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]
[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] this invention relates to the eraser of the liquid-crystal-display picture image for eliminating quickly the display image of the liquid-crystal-display panel with the storage hold function with power OFF of a LCD mainframe like an active matrix liquid crystal display panel, and the LCD equipped with it.
[0002]
[Description of the Prior Art] While an application of LCDs, such as a personal computer, television, a word processor, and a video camera, progresses further in recent years, to such a device, the requests to the further highly-efficient-izing of a miniaturization, power-saving-izing, low-cost-izing, etc. are mounting. That these requests should be filled, recently, it changes to the penetrated type LCD using the light of a back light, and the development of the reflected type LCD which displays by reflecting the incident light from the exterior using a reflecting plate, without using a back light is furthered.
[0003] Furthermore, the reflected type LCD which adopted the active matrix type which was made to make a pixel drive with active elements, such as TFT (TFT), also in the reflected type LCD attracts attention by a high-definition display being obtained by high duty rather than a simple matrix type reflected type LCD.
[0004] However, in the LCD equipped with the above-mentioned active matrix type liquid-crystal-display panel, when the power of a LCD mainframe is turned off, after power OFF will be displayed for a while for the picture in front of power OFF as an after-image by a voltage hold of liquid crystal, the abnormal voltage at the time of power OFF from an active element, etc. Consequently, the debasement as a drop has arisen.
[0005] Such an after-image can make to be visible [by turning off the power of a LCD, simultaneous, or changing a liquid-crystal-display panel into voltage the status that it does not impress, after turning OFF power of a back light previously] in the power of a back light. However, in a reflected type LCD, since an incident light cannot be interrupted, it will not be able to make to be visible in an after-image, but the abnormalities in a display will appear notably.
[0006] Furthermore, the charge held at such liquid crystal has had a bad influence also on the life of liquid crystal not only by the problem of the display quality by the after-image but by abnormal voltage. That is, since the charge held at liquid crystal becomes [being held with as between the things during several seconds until it falls to GND level by natural electric discharge, and], a degradation of liquid crystal will happen by the abnormal voltage impressed to liquid crystal in this term.
[0007] As the technique of eliminating the after-image which is the unusual display at the time of such power OFF, to JP,1-170986,A By supplying the power which prepares the power holding circuit to which after power OFF carries out the predetermined time hold of the operating power supplied to a liquid-crystal-display panel, and is obtained from this power holding circuit to a gate driver Make an active element turn on during a fixed period, the charge held in the liquid-crystal-display panel is made to discharge, and the technique of eliminating an after-image is indicated. The drive wave is shown in drawing 31 .
[0008]

[Problem(s) to be Solved by the Invention] By the way, although the voltage impressed to liquid crystal is controlled by many gradation in between from a threshold voltage to a saturation voltage in the case of a color display, between the applied voltage to liquid crystal, and the speed of response of liquid crystal, a relation to an active matrix type liquid-crystal-display panel which is shown in drawing 32 (a) is. However, in drawing 32 (a), it changes to applied voltage, the number of gradation in the case of an eight gradation display is expressed, and the relation between the number of gradation, applied voltage, and these and permeability is shown in drawing 32 (b).
[0009] As shown in drawing 32 (a), between gradation, the speed of response of liquid crystal becomes slow, and becomes slow between near [a threshold voltage] gradation especially. The energy for this having the small strain of liquid crystal, where the voltage near a threshold voltage is impressed, and reverting is for the parvus.
[0010] Therefore, if the after-image of the halftone near a threshold voltage remains when the power of a LCD is turned off, only by missing the charge by which the restoration energy makes the gate active level during a certain fixed period, and was held after power OFF like the deletion technique of above-mentioned JP,1-170986,A at liquid crystal for the parvus reason, time cannot borrow from a charge escaping and an after-image cannot be eliminated quickly.
[0011] Moreover, even if it makes only the output of a gate driver into active level, according to the status of the voltage impressed to liquid crystal from the operating state of a source driver, or the counterelectrode in a liquid-crystal-display panel, it does not become 0 potential completely, but since the result to which residual voltage is impressed substantially is brought, it is considered that the after-image deletion effect for which it asks is not acquired.
[0012] Consequently, in a penetrated type LCD, after putting out lights of a back light, although it is a short time even if it turns off power by this deletion technique, an after-image looks thin and deterioration of display quality is seen. Moreover, if time will be taken before an after-image eliminates, since abnormal voltage will be impressed to liquid crystal by the influence of a charge by which a short time was also held, liquid crystal will deteriorate.
[0013] Furthermore, by the reflected type LCD, since it is in the same status as after power OFF has always turned on the back light unlike a penetrated type LCD, although an after-image is visible clearly from a penetrated type thing and the problem of a degradation of liquid crystal is of the same grade, display quality becomes still bad than a penetrated type.
[0014] While this invention was made in view of the above-mentioned technical probrem and the purpose eliminates an after-image quickly, it is in offering the eraser of the liquid-crystal-display picture image which can suppress a degradation of liquid crystal.
[0015]
[Means for Solving the Problem] In order to solve the above-mentioned technical probrem, the eraser of the liquid-crystal-display picture image of this invention according to claim 1 The LCD which has the liquid-crystal-display panel driven with an active element is equipped with a pixel. A power OFF detection means to be the eraser of the display image which makes the display image of a liquid-crystal-display panel eliminate at the time of power OFF of a LCD mainframe, and to detect that the power of a LCD mainframe was turned off, A panel power hold means to hold the power power supplied to a liquid-crystal-display panel after turning off the power of a LCD mainframe during a fixed period, If power OFF is detected with the above-mentioned power OFF detection means, it is characterized by having the deletion means which is made to turn on the above-mentioned liquid-crystal-display panel completely in a liquid crystal saturation voltage, and is made to switch off completely continuously after that in the electric power supply from the above-mentioned panel power hold means.
[0016] According to this, if the power of a LCD mainframe is turned off, a power OFF detection means detects this, and a panel power hold means will hold the power power supplied to a liquid-crystal-display panel during a fixed period, after turning off the power of a LCD mainframe. Thereby, after turning off the power of a LCD mainframe, a liquid-crystal-display panel can be driven.
[0017] And when power OFF is detected with a power OFF detection means, a deletion means makes a liquid-crystal-display panel turn on completely in a liquid crystal saturation voltage, and

makes the light put out completely continuously after that in the electric power supply from a panel power hold means.
[0018] Since the picture image of halftone is displayed on a liquid-crystal-display panel even if, a saturation voltage is once impressed to the liquid crystal of a liquid-crystal-display panel even if the strain of liquid crystal is small and the energy for a restoration is small, and the energy for a restoration is fully raised by this, liquid crystal will return to the original status quickly by subsequent complete putting out lights, and an after-image will be eliminated quickly.
[0019] And the above-mentioned deletion means can make an after-image eliminate more quickly like in this case by driving a liquid-crystal-display panel so that the voltage impressed to liquid crystal may turn into the voltage which liquid crystal turns off, in case [according to claim 2] the light is continuously put out completely after complete lighting.
[0020] although it will require 320 msecs for returning to the black status of gradation 8 if it comes out as it is and it is when power is turned off in the state of a display of gradation 6 as shown in the above-mentioned drawing 32 (a) and (b), it is a saturation voltage's being impressed and once, going via the status of gradation 1, and 70 msec, it comes out not much and is eliminated
[0021] It is TFT (Thin Film Transistor) as an active element. Although the liquid crystal with high retention is needed and more than the high liquid crystal (generally 1x1012ohm and cm) of a specific resistance is generally used when using an element, since the high liquid crystal of such a specific resistance has a long charging time value, an after-image further seldom disappears. In such a case, once it impresses a saturation voltage as mentioned above, it is very effective to impress OFF voltage.
[0022] And I understand that the charge of the liquid crystal held by an after-image being eliminated quickly, i.e., a short time, discharges, it is, and a degradation of the liquid crystal by abnormal voltage can also be suppressed.
[0023] The eraser of the liquid-crystal-display picture image of this invention according to claim 3 In the configuration of a claim 2 the above-mentioned deletion means The gate driving signal which turns on a fixed term more than 1 perpendicular term and a gate line one by one, and turns on an active element for every gate line from a gate driver is made to output. A video signal which is completely turned on from a source driver in this term is made to output. It is characterized by making the gate driving signal which turns on a fixed term more than 1 perpendicular term, and a gate line one by one from a gate driver, and turns on an active element for every gate line output, and making a video signal which is completely switched off from a source driver in this term output continuously after that.
[0024] This is one configuration which realizes the deletion means indicated to the claim 2, and it is driving a gate driver and a source driver as mentioned above, and since the light is switched on completely in a fixed term more than 1 perpendicular term and is put out completely after that in a fixed term more than 1 perpendicular term, a liquid-crystal-display panel can constitute a deletion means easily.
[0025] The eraser of the liquid-crystal-display picture image of this invention according to claim 4 In the configuration of a claim 2 the above-mentioned deletion means The gate side compensation means to which the gate driving signal which makes the vertical-retrace-line term within 1 perpendicular term turn on the active element on [all] a gate line simultaneously from a gate driver is made to output, It has the source side compensation means to which a video signal which is turned on completely is made to output from a source driver so that it may synchronize with the gate driving signal outputted from this gate side compensation means, and it is characterized by making 1 vertical-retrace-line term turn on a liquid-crystal-display panel completely.
[0026] According to this, complete lighting at the time of power OFF of a LCD mainframe is performed by the source side compensation means with which the deletion means was equipped, and the gate side compensation means using the vertical-retrace-line term of 1 perpendicular term. Therefore, the after-image of liquid crystal can be eliminated still more quickly than the configuration of a claim 3 which complete lighting and complete putting out lights of a liquid-crystal-display panel of were attained within 1 perpendicular term, and was described above, and a

degradation of liquid crystal can be suppressed still effectively.
[0027] The eraser of the liquid-crystal-display picture image of this invention according to claim 5 In the configuration of a claim 2 the above-mentioned deletion means The gate side compensation means to which a gate driving signal which the vertical-retrace-line term and this period within 1 perpendicular term are exceeded [driving signal], and makes the active element on [all] a gate line turn on simultaneously from a gate driver is made to output, It is characterized by having the source side compensation means to which a video signal which turns on completely and is switched off completely continuously is made to output from a source driver so that it may synchronize with the gate driving signal outputted from this gate side compensation means.
[0028] According to this, by the source side compensation means with which the deletion means was equipped, and the gate side compensation means, since complete lighting and complete putting out lights at the time of power OFF of a LCD mainframe can carry out in the term when it is still short than 1 perpendicular term, they can eliminate the after-image of liquid crystal still more quickly than the above-mentioned configuration of a claim 4, and can suppress a degradation of liquid crystal still effectively.
[0029] The eraser of the liquid-crystal-display picture image of this invention according to claim 6 is characterized by being allotted to the input side of a video-signal distribution means to distribute the compound video signal with which the above-mentioned source side compensation means consists of a video signal of two or more colors to a monochromatic video signal for every color in the claim 4 and the configuration of 5.
[0030] According to this, compared with the case where a video signal which is completely turned on so that a source side compensation means may synchronize with the gate driving signal outputted from a gate side compensation means is generated after distributing to a monochromatic video signal, since it generated in the state of the composite which consists of a video signal of two or more colors, the configuration of a source side compensation means is simple, and the eraser itself can be made small.
[0031] The eraser of the liquid-crystal-display picture image of this invention according to claim 7 The LCD which has the liquid-crystal-display panel driven with an active element is equipped with a pixel. A power OFF detection means to be the eraser of the display image which makes the display image of a liquid-crystal-display panel eliminate at the time of power OFF of a LCD mainframe, and to detect that the power of a LCD mainframe was turned off, A panel power hold means to hold the power power supplied to a liquid-crystal-display panel after turning off the power of a LCD mainframe during a fixed period, When power OFF is detected with the above-mentioned power OFF detection means, in the electric power supply from the above-mentioned panel power hold means It is characterized by having a deletion means to drive a liquid-crystal-display panel and to make a liquid-crystal-display panel switch off completely so that the voltage impressed to liquid crystal may turn into the voltage which liquid crystal turns off.
[0032] According to this, if the power of a LCD mainframe is turned off, a power OFF detection means detects this, and a panel power hold means will hold the power power supplied to a liquid-crystal-display panel during a fixed period, after turning off the power of a LCD mainframe. Thereby, after turning off the power of a LCD mainframe, a drive of a liquid-crystal-display panel is attained.
[0033] And if power OFF is detected with a power OFF detection means, while a deletion means makes the energization status each circuit which drives a liquid-crystal-display panel during a fixed period and turns on an active element, the voltage positively impressed to liquid crystal at a video signal or a counterelectrode signal controls so that liquid crystal serves as the voltage to turn off, and a liquid-crystal-display panel is made to switch off completely.
[0034] I understand that the charge of the liquid crystal held by an after-image being eliminated quickly and an after-image being eliminated quickly by this, i.e., a short time, discharges, it is, and a degradation of the liquid crystal by abnormal voltage can also be suppressed.
[0035] Although a saturation voltage is once impressed to liquid crystal in case of an after-image deletion and the stability of liquid crystal is raised with the above-mentioned configuration of a claim 1-2 The voltage positively impressed to liquid crystal at a video signal or a counterelectrode

signal after it did not once impress a saturation voltage but ** has also turned on the active element by some liquid crystal is making the light control and put out completely so that liquid crystal may serve as the voltage to turn off, and some from which an after-image is eliminated at sufficiently high speed also have it.

[0036] The eraser of the liquid-crystal-display picture image of this invention according to claim 8 In the configuration of a claim 7 the above-mentioned deletion means The gate driving signal which turns on a gate line one by one and turns on an active element for every gate line from a gate driver is made to output. And it is characterized by making it output from a source driver and a counterelectrode signal-control circuit, respectively as a voltage on which liquid crystal turns off the counterelectrode signal impressed to the counterelectrode of the video signal and liquid-crystal-display panel which are impressed to a pixel electrode.

[0037] According to this, since the signal outputted from a gate driver outputs the signal which make all switching elements an active state all at once, the time which a deletion operation takes is possible from shortest 1 / 2 level term, and can eliminate an after-image in very short time.

[0038] The eraser of the liquid-crystal-display picture image of this invention according to claim 9 In the configuration of a claim 7 the above-mentioned deletion means The gate driving signal which makes the active element on [all] a gate line turn on simultaneously from a gate driver is made to output. And it is characterized by making it output from a source driver and a counterelectrode signal-control circuit, respectively as a voltage on which liquid crystal turns off the counterelectrode signal impressed to the counterelectrode of the video signal and liquid-crystal-display panel which are impressed to a pixel electrode.

[0039] Although according to this the time taken to eliminate an after-image since an active element is turned on one by one for every line like a usual drive is 1 perpendicular term need at least and becomes long compared with the configuration of a claim 8, a gate driver required to output a gate driving signal, its control circuit, etc. have the advantage that it can correspond with the existing configuration.

[0040] The eraser of the liquid-crystal-display picture image of this invention according to claim 10 In the configuration of a claim 7 the above-mentioned deletion means The gate driving signal fixed to the power potential supplied to a gate driver is made to output to all gate lines from a gate driver. And it is characterized by making it output from a source driver and a counterelectrode signal-control circuit, respectively as a voltage on which liquid crystal turns off the counterelectrode signal impressed to the counterelectrode of the video signal and liquid-crystal-display panel which are impressed to a pixel electrode.

[0041] According to this, rather than the configuration of a claim 9, time which a deletion operation takes can be shortened and, moreover, there is also an advantage that a gate driver required to output a gate driving signal can be corresponded with the existing configuration.

[0042] The eraser of the liquid-crystal-display picture image of this invention according to claim 11 In the claims 1 and 2 or the configuration of 7, the switch of the power prepared in the above-mentioned LCD mainframe It is the configuration which outputs a judgment pulse for every one switch operation. the above-mentioned power OFF detection means It detects that the power of a LCD mainframe was turned off when this judgment pulse was inputted in the status that the LCD mainframe is turned on. a panel power hold means If OFF of power is detected with the above-mentioned power OFF detection means, it is characterized by being the configuration of making it turning off after predetermined carries out time progress of the switch means arranged on the main-power-supply line which performs electrode supply from a main-power-supply means on a LCD mainframe.

[0043] The switches of the above-mentioned power are switches which are connected or cut systematically, such as not the switches that are connected or cut mechanically, such as a toggle switch, but a baton switch.

[0044] According to this, a panel power hold means judges ON/OFF of power on the basis of the judgment pulse outputted from the switch of this power. Since it is made to turn off when switched to ON->OFF after predetermined carries out time progress of a switch means by which it is allotted to a main-power-supply line and connection or the disconnection control of the electric

power supply from a main-power-supply means can be carried out using another control circuits, such as a relay switch A panel power hold means can be realized systematically, without preparing auxiliary power etc. separately.
[0045] The LCD of this invention according to claim 12 is a reflected type LCD which displays on the claim 1 or either of 11 by reflecting the incident light equipped with the eraser of a liquid-crystal-display picture image given in three from the exterior.
[0046] although an after-image tends to be conspicuous especially since there is an ambient light even if it carries out power OFF, by combining with the eraser of the above-mentioned claims 1-11, a reflected type LCD can boil the display quality markedly, can raise it, and can realize the reflected type LCD which was excellent in display quality
[0047] The LCD of this invention according to claim 13 is a LCD equipped with the eraser of the claim 1 or a liquid-crystal-display picture image given in three to either of 11 which has a guest host type liquid-crystal-display panel.
[0048] although especially the speed of response of liquid crystal is slow and an after-image seldom disappears, by combining with the eraser of the above-mentioned claims 1-11, guest host type liquid crystal makes an after-image eliminate quickly, the display quality can be boiled markedly, and it can raise it, and can realize the guest host type LCD which was excellent in display quality
[0049]
[Embodiments of the Invention]
It is as follows if one gestalt of the operation concerning the [gestalt 1 of operation] this invention is explained based on the drawing 1 or the drawing 3 .
[0050] The LCD of the gestalt of this operation is equipped with the liquid-crystal-display panel 1, the source mechanical component 2, the gate mechanical component 3, the driving-signal occurrence circuit 8, the power control section 9, the auxiliary power 10, the microcomputer (a microcomputer is called hereafter) 11, the detector 12, the pen input unit 13, and the main power supply 14 as shown in drawing 1 .
[0051] The liquid-crystal-display panel 1 is the configuration that the glass substrate of a couple was stuck and guest host liquid crystal was pinched in the meantime, and is a reflected type type equipped with the reflecting plate which uses the incident light from the exterior for a display. The representative circuit schematic is shown in drawing 2 . As shown in this drawing, by the liquid-crystal-display panel 1, two or more pixel 22 -- which consists of liquid crystal is arranged in the shape of [of a m line n train] a matrix. A pixel 22 is connected to the drain of TFT23 the display electrode 22a of whose is an active element, and the source and the gate of TFT23 are connected to the source line 24 and the gate line 25 which intersect perpendicularly mutually, respectively. Moreover, a pixel 22 is countered with display electrode 22a, and counterelectrode 22b is formed in it. The voltage impressed to the liquid crystal which constitutes a pixel 22 is a voltage value according to the video signal mentioned later, and the arbitrary voltages of the between from the voltage of on-level which is the saturation voltage of liquid crystal to the voltage of off-level lower than the threshold voltage which liquid crystal turns off are impressed.
[0052] The source mechanical component 2 consists of a video-signal distribution circuit 5, a driver controller 4, and a source driver 6, as shown in drawing 1 . In the source mechanical component 2, the compound video signal which consists of a video signal of two or more colors inputted from the driving-signal occurrence circuit 8 mentioned later is distributed to the monochrome video signal for every R, G, and B in the video-signal distribution circuit 5 which is a video-signal distribution means. And it outputs to the n sources line 24 (241-24n) of the liquid-crystal-display panel 1 which described each monochrome video signal above from the driver controller 4 synchronizing with the horizontal synchronizing signal into which it is inputted by the source driver 6 all at once (refer to the drawing 2). By this, the monochrome video signal on which the pixel 22 for one line of the liquid-crystal-display panel 1 should be displayed will be outputted for every 1 level term.
[0053] The gate mechanical component 3 consists of a driver controller 4 and a gate driver 7. m gate lines 25 (251-25m) of the above-mentioned liquid-crystal-display panel 1 are driven to the

high level between 1 level terms one by one, and TFT23 for one line is made to turn on one by one from the 1st line to the m-th line in the gate mechanical component 3. Thereby, a gate driving signal comes to be impressed to the corresponding pixel 22.

[0054] The driver controller 4 is a circuit which generates the horizontal synchronizing signal and vertical synchronizing signal which are a synchronizing signal for carrying out based on the compound video signal inputted from the driving-signal occurrence circuit 8 mentioned later, and synchronizing a drive of the source driver 6 and the gate driver 7. Moreover, the driver controller 4 is also the circuit which is equipped with a shift register (not shown) and generates a gate driving signal. In the shift register in the driver controller 4, if a vertical synchronizing signal is supplied to the 1st step of data terminal as a start signal and a horizontal synchronizing signal is supplied to the clock terminal of each card row, the pulse by which 1 level term [every] sequential retardation of the start signal (one vertical synchronizing signal) was carried out will be outputted from the output terminal of each card row, and will be given to the gate driver 7. This is a usual gate driving signal. In the gate driver 7, the level conversion of the inputted above-mentioned pulse is carried out, and it is 251-25m of the gate lines of the liquid-crystal-display panel 1. It outputs (refer to the drawing 2).

[0055] The driving-signal occurrence circuit 8 gives the arbitrary compound video signals usually memorized by the memory not to illustrate to the video-signal occurrence circuit 5 and the driver controller 4. And the driving-signal occurrence circuit 8 also outputs a compound video signal which will output a compound video signal which a liquid crystal saturation voltage is impressed and the liquid-crystal-display panel 1 turns on completely during the period more than 1 perpendicular term, and will be completely switched off after that as another function if the power OFF signal mentioned later is inputted. That is, the function as a deletion means of this invention is added to this driving-signal occurrence circuit 8 and the above-mentioned driver controller 4.

[0056] The power control section 9 controls the electric power supply for making the liquid-crystal-display panel 1 drive supplied to the liquid-crystal-display panel 1 from the main power supply 14 of a LCD mainframe. In addition, in drawing 1 , the bus line which is not illustrated of course is connected to the above-mentioned source mechanical component 2 which is a drive system for the bus line of the electric power supply from a main power supply 14 making the liquid-crystal-display panel 1 drive although it connects only with the driving-signal occurrence circuit 8, the gate mechanical component 3, etc., and power is supplied.

[0057] A microcomputer 11 is a control center which controls each fraction of a LCD mainframe. And again, if designation of an user is inputted using the pen input unit 13, with a detector 12, from the relation with a coordinate position, the content of designation will be detected and it will input into a microcomputer 11. If OFF of the main power supply 14 of a LCD mainframe is directed by the user using the pen input unit 13 and the content of designation is inputted from a detector 12 in a microcomputer 11 by this, a power OFF signal will be outputted to a main power supply 14, the auxiliary power 10, and the driving-signal occurrence circuit 8.

[0058] Auxiliary power 10 is allotted from the main power supply 14 on the bus line of the electric power supply to the liquid-crystal-display panel 1, and has the function as a panel power hold means. Auxiliary power 10 will supply the operating power for making the liquid-crystal-display panel 1 drive to the driving-signal occurrence circuit 8, the source mechanical component 2, the gate mechanical component 3, etc., if a power OFF signal is inputted from a microcomputer 11.

[0059] Next, the operation in the LCD which has the above-mentioned configuration when the designation which turns off a main power supply 14 from an user is made is explained, referring to the wave form chart of drawing 3 .

[0060] If the designation which turns off the main power supply 14 of a LCD from an user using the pen input unit 13 is inputted, a detector 12 will detect the content of designation and it will input that designation of power OFF was made into a microcomputer 11. With a microcomputer 11, the power OFF signal which directs OFF of a main power supply 14 is outputted to a main power supply 14, the auxiliary power 10, and the driving-signal occurrence circuit 8. A main power supply 14 is turned off by the input of this power OFF signal. The electric power supply to

the liquid-crystal-display panel 1 which minds the power control section 9 now is intercepted. On the other hand, in auxiliary power 10, it turns on in a power OFF signal being inputted, and during a fixed term, a main power supply 14 is replaced and the power for an operation is supplied to the liquid-crystal-display panel 1.

[0061] And in the driving-signal occurrence circuit 8, if it drives by the electric power supply from auxiliary power 10 and a power OFF signal is inputted, the compound video signal for making the liquid-crystal-display panel 1 turn on completely during a fixed period more than 1 perpendicular term in the saturation voltage of liquid crystal will be generated, and it will output to the source mechanical component 2 and the gate mechanical component 3. this shows in drawing 3 from the gate mechanical component 3 -- as -- 251-25m of the gate lines of the liquid-crystal-display panel 1 the gate driving signal made into ON status one by one inputs -- having -- this gate driving signal -- synchronizing -- 241-24n of the source lines of the liquid-crystal-display panel 1 from the source mechanical component 2 on-level wave impresses -- having -- the liquid-crystal-display panel 1 -- the whole between surface more than 1 perpendicular term -- the light is switched on

[0062] Furthermore, continuously, the driving-signal occurrence circuit 8 generates the compound video signal for making the liquid-crystal-display panel 1 switch off completely during a fixed period more than 1 perpendicular term, and outputs it to the source mechanical component 2 and the gate mechanical component 3 after that. this shows in drawing 3 from the gate mechanical component 3 -- as -- 251-25m of the gate lines of the liquid-crystal-display panel 1 the gate driving signal made into ON status one by one inputs -- having -- this gate driving signal -- synchronizing -- 241-24n of the source lines of the liquid-crystal-display panel 1 from the source mechanical component 2 off-level wave impresses -- having -- the liquid-crystal-display panel 1 -- the whole between surface more than 1 perpendicular term -- the light is put out

[0063] Then, auxiliary power 10 turns off and a drive of a LCD stops including the liquid-crystal-display panel 1.

[0064] As mentioned above, at the LCD of the gestalt of this operation, even if the main power supply 14 of a LCD is turned off, in the electric power supply by auxiliary power 10, the light is once completely switched on in the saturation voltage of liquid crystal, and the liquid-crystal-display panel 1 is switched off completely continuously after that.

[0065] Since the picture image of halftone is displayed on the liquid-crystal-display panel 1 even if, a saturation voltage is once impressed to all pixel 22 -- of the liquid-crystal-display panel 1 by this as the strain of liquid crystal is small and the restoration energy from which liquid crystal is the late guest host liquid crystal of a speed of response, and moreover returns to the status of a dimension much more is small, and the energy for a restoration is fully raised, an after-image will be quickly eliminated by subsequent complete putting out lights. And it also enables a degradation of the liquid crystal by abnormal voltage to discharge and to prevent again, the charge of the liquid crystal held for a short time. although this LCD is a reflected type these results, display quality becomes the outstanding thing which was markedly alike and improved compared with the thing of the conventional deletion technique

[0066] It is as follows if other gestalt of the operation concerning the [gestalt 2 of operation] this invention is explained based on drawing 1 , the drawing 4 , or the drawing 7 . In addition, the same sign is appended to the member of an explanation shown with the gestalt of the aforementioned operation, and the member which has the same function for convenience, and the explanation is omitted.

[0067] In the LCD of the gestalt of this operation, as shown in drawing 4 , the source side compensating circuit 31 is arranged between driving-signal occurrence circuit 8' and the video-signal distribution circuit 5, and the gate side compensating circuit 30 is arranged between driver controller 4' and the gate driver 7.

[0068] And from driving-signal occurrence circuit 8', the compound video signal of on-level which makes the liquid-crystal-display panel 1 turn on completely in a liquid crystal saturation voltage, and the compound video signal of off-level which is made to switch off completely are outputted to a separate bus line (not shown), and the input (here input to the video-signal

distribution circuit 5) to the liquid-crystal-display panel 1 of both outputs carries out a change control by the source side compensating circuit 31.
[0069] The circuit diagram of the source side compensating circuit 31 is shown in drawing 5 . From the input side of a switch SW1, the compound video signal of on-level generated in driving-signal occurrence circuit 8' at the time of OFF of the main power supply 14 of a LCD mainframe inputs. On the other hand, usually, at the time, from the input side of a switch SW2, arbitrary video signals are inputted from driving-signal occurrence circuit 8', and the compound video signal of off-level inputs from it, at the time of OFF of a main power supply 14.
[0070] And these switches SW1 and SW2 are turned on if the voltage of L (low) level is inputted, the voltage of L level is usually impressed to the switch SW2, and the usual compound video signal is outputted from the source side compensating circuit 31. However, when the designation which turns off a main power supply 14 is inputted, and a certain power OFF signal set to H (quantity) level in term pulse is outputted and it is inputted into the source side compensating circuit 31 from a microcomputer 11, a switch SW2 is set to H level in pulse, it will switch off, the switch SW1 into which the voltage of L level is inputted through an inverter 33 will switch on in the meantime, and the compound video signal of on-level will output it.
[0071] The time when the power OFF voltage outputted from a microcomputer 11 is outputted in pulse here is set up almost similarly to the time of the blanking term which is vertical-retrace-line feedback when the usual video signal within 1 perpendicular term is not written in, and the compound video signal of on-level which makes a blanking term turn on the liquid-crystal-display panel 1 completely in a liquid crystal saturation voltage will be outputted by this.
[0072] On the other hand, it is 251-25m of m gate lines of the liquid-crystal-display panel 1 from driver controller 4'. The usual gate driving signal which carries out sequential ON during every 1 level period, It is 251-25m of m gate lines to a blanking term. The gate driving signal turned on altogether It is outputted to a separate bus line (not shown), and the input (here input to the gate driver 7) to the liquid-crystal-display panel 1 of both outputs carries out a change control by the gate side compensating circuit 30.
[0073] The circuit diagram of the gate side compensating circuit 30 is shown in drawing 6 . They are all the gate lines 251-25m from driver controller 4' at the time of OFF of the main power supply 14 from the input side of a switch SW3. The gate driving signal turned on altogether inputs. On the other hand, a usual gate driving signal inputs from the input side of a switch SW4.
[0074] These switches SW3 and SW4 are what is turned on like the switch SW1 of the above-mentioned source side compensating circuit 31, and SW2 if the voltage of L level is inputted. The voltage of L level is usually impressed to the switch SW4, and a usual gate driving signal is outputted from the gate side compensating circuit 30. When a certain power OFF signal set to H level in term pulse is outputted, it is inputted into the gate side compensating circuit 30 and a switch SW3 turns on in pulse from a microcomputer 11, it is 251-25m of all gate lines. The gate driving signal turned on altogether is inputted. In addition, although the publication is omitted in drawing 4 , such a gate side compensating circuit 30 is 251-25m of gate lines. It is prepared for every line.
[0075] In the LCD of the gestalt of this operation which has such a configuration, the wave form chart of the driving signal impressed to the liquid-crystal-display panel 1 after directing OFF of a main power supply 14 will come to be shown in drawing 7 , and the liquid-crystal-display panel 1 will be completely turned on during the blanking of 1 perpendicular term. Complete lighting and complete putting out lights within 1 perpendicular term are attained by this, it is still quick, an after-image deletion is attained from the LCD of the gestalt 1 of operation, and a degradation of the liquid crystal by impression of abnormal voltage can be suppressed still effectively in connection with it.
[0076] In addition, at this LCD, the deletion means equipped with the source side compensation means of this invention and the gate side compensation means consists of driving-signal occurrence circuit 8', a source side compensating circuit 31, and driver controller 4' and the gate side compensating circuit 30.
[0077] By the way, as a configuration of the LCD which performs complete lighting of the liquid-

crystal-display panel 1 using a blanking term, a configuration which is shown in drawing 8 and the drawing 9 in addition to this is also possible like the above-mentioned LCD of the gestalt of this operation.

[0078] In the LCD shown in drawing 8 , the above-mentioned source side compensating circuit 31 is arranged between the video-signal distribution circuits 5 and the source drivers 6 which are the output side of the video-signal distribution circuit 5. With such a configuration, since the compound video signal from driving-signal occurrence circuit 8' is already distributed to the monochrome video signal of R, G, and B by passing through the video-signal distribution circuit 5, it is necessary to form the above-mentioned source side compensating circuit 31 for every source wiring of R, G, and B.

[0079] Moreover, in the LCD shown in drawing 9 , it is the configuration of having formed the above-mentioned source side compensating circuit 31 in source driver 6', further. To source driver 6' into which two or more monochrome video signals for forming a color picture or monochrome picture image are inputted, since the direct file was carried out, it is 241-24n of source lines further in this case. Only a number needs to form the above-mentioned source side compensating circuit 31.

[0080] In addition, although the wave form chart of the driver voltage of the liquid-crystal-display panel 1 becomes the same thing as drawing 7 , if the LCD of the configuration of such drawing 8 and the drawing 9 also considers it from the simplicity of the configuration of a LCD, its configuration of drawing 4 is the most desirable.

[0081] It is as follows if the gestalt of further others of the operation concerning the [gestalt 3 of operation] this invention is explained on the basis of drawing 10 and the drawing 11 . In addition, the same sign is appended to the member of an explanation shown with the gestalt of the aforementioned operation, and the member which has the same function for convenience, and the explanation is omitted.

[0082] In the LCD of the gestalt of this operation, as shown in drawing 10 , the source side compensating circuit 31 is arranged between driving-signal occurrence circuit 8' and the video-signal distribution circuit 5, and the driver controller 35 latches and holds the front vertical synchronizing signal, if a power OFF signal is inputted, all at once, predetermined will term-extend a vertical synchronizing signal and they will be outputted.

[0083] For the wave form chart of the driving signal impressed to the liquid-crystal-display panel 1 after directing OFF of a main power supply 14 in the LCD of the gestalt of this operation which has such a configuration, the gate driving signal which comes to show in drawing 11 , and exceeds and turns on the blanking term of 1 perpendicular term is 251-25m of the gate lines of the liquid-crystal-display panel 1. It will be outputted all at once. By this, it is still quick, an after-image deletion is attained from the LCD of the gestalt 2 of operation, and a degradation of the liquid crystal by impression of abnormal voltage can be suppressed still effectively in connection with it.

[0084] It is as follows if the gestalt of further others of the operation concerning the [gestalt 4 of operation] this invention is explained on the basis of drawing 10 and the drawing 12 . In addition, the same sign is appended to the member of an explanation shown with the gestalt of the aforementioned operation, and the member which has the same function for convenience, and the explanation is omitted.

[0085] In the LCD of the gestalt of this operation, as shown in drawing 10 , source side compensating-circuit 31' is arranged between driving-signal occurrence circuit 8" and the video-signal distribution circuit 5, and the driver controller 35 latches and holds the front vertical synchronizing signal, if a power OFF signal is inputted, all at once, predetermined will term-extend a vertical synchronizing signal and they will be outputted.

[0086] From above-mentioned driving-signal occurrence circuit 8", within the blanking term of 1 perpendicular term From on-level which is made to turn on completely in a liquid crystal saturation voltage, the liquid-crystal-display panel 1 The compound video signal which switches to off-level which is made to switch off completely continuously is outputted. The input (here input to the video-signal distribution circuit 5) to the liquid-crystal-display panel 1 of both the

outputs of the compound video signal of this on-level and off-level and a usual video signal carries out a change control in source side compensating-circuit 31'. Therefore, it is the same as that of the thing of the source side compensating circuit 31 shown in drawing 5 , the compound video signal of on-level and off-level is merely inputted into a switch SW1, and a usual compound video signal inputs the circuit arrangement of source side compensating-circuit 31' into a switch SW2.

[0087] For the wave form chart of the driving signal impressed to the liquid-crystal-display panel 1 after directing OFF of a main power supply 14 in the LCD of the gestalt of this operation which has such a configuration, as shown in drawing 12 , a gate driving signal is 251-25m of the gate lines of the liquid-crystal-display panel 1 within the blanking term of 1 perpendicular term. It is outputted all at once, and a video signal will be turned on and it will be turned off continuously in the meantime. By this, it is still quick, an after-image deletion is attained from the LCD of the gestalt 3 of operation, and a degradation of the liquid crystal by impression of abnormal voltage can be suppressed still effectively in connection with it.

[0088] In addition, what is necessary is just to perform it as follows with the above-mentioned gestalt of each operation, when not using a microcomputer 11 etc., although it has not considered as the configuration which established a power OFF detection means to have made the function to detect OFF of a main power supply 14 add to a microcomputer 11, and to detect especially OFF of a main power supply 14, since the power OFF signal from a microcomputer 11 was used using the microcomputer 11.

[0089] That is, the output voltage from a main power supply 14 is observed, the detector which detects that the main power supply 14 was turned off in the voltage drop is formed, and it considers as the configuration to which the video signal at the time of OFF of a main power supply 14 is made to output from the driving-signal occurrence circuit 8 (8'and8") with this detector. In this case, although a detector is good also as a configuration which outputs the signal which tells that the main power supply 14 was turned off to the driving-signal occurrence circuit 8 (8'and8") when it falls even to the level with a voltage It is more desirable to consider as the configuration which outputs the signal which tells that the main power supply 14 was turned off to the driving-signal occurrence circuit 8 (8'and8"), when [which carried out time progress] the voltage begins to descend rather than it, since there is a possibility of malfunctioning when the output voltage from a main power supply 14 sways up and down.

[0090] Moreover, with the above-mentioned gestalt of each operation, as a panel power hold means, although auxiliary power 10 is used, when using a microcomputer 11 in addition to this, considering that a main power supply 14 is turned off by the power OFF signal outputted with a microcomputer 11 as the configuration delayed only while driving with a certain retardation means for the above-mentioned auxiliary power's 10 deletion of the liquid-crystal-display panel 1 of a display image is also considered.

[0091] Moreover, the configuration in which itself has power generation capacity, or the configuration which accumulates the electric power supply from a main power supply 14 using the capacitor etc. is sufficient as auxiliary power 10. In addition, although the pen input unit 13 was used, ON/OFF of the line rocker switch which is not specially restricted to this and is prepared in the LCD mainframe is also enough.

[0092] It is as follows if the gestalt of further others of the operation concerning the [gestalt 5 of operation] this invention is explained on the basis of the drawing 13 or the drawing 24 . In addition, the same sign is appended to the member of an explanation shown with the gestalt of the aforementioned operation, and the member which has the same function for convenience, and the explanation is omitted.

[0093] At the LCD of the gestalt of this operation, as shown in drawing 13 , it consists of the liquid-crystal-display panel 1, the source driver 52, the gate driver 53, the control circuit for source drivers 54, the control circuit for gate drivers 55, the power control circuit 56, the counterelectrode signal-control circuit 57, a judgment switch (line rocker switch) 58, the power for a judgment 59, and a relay switch 60.

[0094] The supply voltage for some control signals and the video signal which are outputted from

the control circuit for source drivers 54 which the source driver 52 mentions later operating this drive circuit from the power control circuit 56 which it is supplied through the source control signal line 61 and the video-signal line 62, respectively, and is mentioned later is supplied through the source power line 63. And the source drivers 52 are outputted all at once 241-24n of the n sources lines of the liquid-crystal-display panel 1 which mentioned the inputted video signal above synchronizing with the horizontal synchronizing signal of some control signals (refer to the drawing 2). By this, the data signal for displaying the pixel 22 for one line of the liquid-crystal-display panel 1 will be outputted for every 1 level term.

[0095] In addition, although a video signal is indicated supposing the case of the color, even if it is a liquid-crystal-display panel for monochrome temporarily, since structure except a video-signal line hardly changes, it omits the explanation here.

[0096] The control circuit for source drivers 54 is for controlling the source driver 52, as mentioned above, and the supply voltage supplied from the power control circuit 56 mentioned later is inputted through the supply voltage line 67. Moreover, a original video signal is inputted into the control circuit for source drivers 54 through the original video-signal line 68, and a synchronizing signal is inputted into it through the synchronizing signal line 69. And the control circuit for source drivers 54 creates the video signal of the request of these original video signals and synchronizing signal which are inputted to origin, and a control signal, and supplies them to the source driver 52 through the source control signal line 61 and the video-signal line 62.

[0097] Moreover, the source enable signal line 70 other than a signal line 61-62-67-68-69 shown above is connected to this control circuit for source drivers 54. This is for transmitting the source enable signal for judging whether the deletion operation outputted from the power control circuit 56 is carried out. It sets to the control circuit for source drivers 54, and the square-wave signal of the counterelectrode signal which this source enable signal changes the term of H level to a usual video signal, and mentions later, an inphase, and this voltage level is outputted to the source driver 52.

[0098] The supply voltage for some control signals outputted from the control circuit for gate drivers 55 mentioned later being inputted through the gate-control signal line 64, and operating this drive circuit from the power control circuit 56 is supplied to the gate driver 53 through the gate power line 66. And the gate driver 53 is 251-25m of m gate lines of the above-mentioned liquid-crystal-display panel 1. It minds, and based on some control signals inputted from the gate-control signal line 64, a usual gate driving signal is outputted and TFT23 for one line is turned on one by one for every 1 level term from the 1st line to the m-th line. By this, a gate driving signal will be impressed to the corresponding pixel 22.

[0099] Moreover, the ****** bull pulse later mentioned through the ****** bull pulse signal line 65 is supplied to the gate driver 53 from the control circuit for gate drivers 55. When a ****** bull pulse is inputted, it changes to a usual gate driving signal, and a ****** bull pulse is outputted as it is, and the gate driver 53 is 251-25m of m gate lines of the above-mentioned liquid-crystal-display panel 1. All upper TFT23 is turned on all at once simultaneously.

[0100] The control circuit for gate drivers 55 is for controlling the gate driver 53, as mentioned above, the supply voltage supplied from the power control circuit 56 mentioned later is inputted through the supply voltage line 71, and a synchronizing signal is inputted through the synchronizing signal line 69. And the control circuit for gate drivers 55 creates the control signal of the request of this synchronizing signal to origin, and supplies it to the gate driver 53 through the gate-control signal line 64.

[0101] Moreover, the above mentioned gate enable signal line 72 and the above mentioned ****** bull pulse signal line 65 other than a signal line 64-69-71 are connected to the control circuit for gate drivers 55. The gate enable signal line 72 is for judging whether the deletion operation outputted from the power control circuit 56 is carried out. In the control circuit for gate drivers 55, if this gate enable signal is inputted on H level, the ****** bull pulse which predetermined pulse width described above will be outputted to the gate driver 53 through the ****** bull pulse signal line 65.

[0102] The counterelectrode signal-control circuit 57 controls the counterelectrode signal

impressed to counterelectrode 22b in the liquid-crystal-display panel 1 based on the supply voltage inputted through the power line 73 from the synchronizing signal into which it is inputted from the synchronizing signal line 69, and the power control circuit 56, and impresses a counterelectrode signal to counterelectrode 22b through the counterelectrode signal line 74.
[0103] Moreover, the opposite enable signal line 75 for judging whether the deletion operation outputted also to the counterelectrode signal-control circuit 57 from the power control circuit 56 is carried out is also connected. The counterelectrode signal-control circuit 57 outputs the square-wave signal of the square-wave signal with which an opposite enable signal is outputted from the control circuit for source drivers 54 of the above-mentioned during the period of H level, an inphase, and this voltage level as a counterelectrode signal.
[0104] The judgment switch 58 carries out the duty of the main switch of a LCD mainframe, and as for a LCD mainframe, a switch of ON/OFF is performed whenever the judgment switch 58 is pushed. The judgment switch 58 is outputting ON/OFF judging signal to the power control circuit 56, and while the judgment switch 58 is pushed, ON/OFF judging signal serves as H level which has a fixed voltage level, and outputs a judgment signal pulse (judgment pulse). In addition, a voltage level when the judgment switch 58 is not pushed is 0V.
[0105] The power for a judgment 59 is the power for generating the judgment signal pulse of ON/OFF judging signal outputted when the judgment switch 58 is pushed, and power consumption can consist of a parvus sake, for example, a button cell, and a dry element battery extremely.
[0106] The power control circuit 56 has the main-power-supply line 76 which obtains the main power supply for operating a LCD mainframe through each power line 61-66-67-71-73 for supplying the supply voltage for operating each control circuit 54-55-57 and each drive circuit 52-53 which were mentioned above, and the relay switch 60, and the various above-mentioned enable signal lines 70-72-75.
[0107] The power control circuit 56 is connected also to the above-mentioned judgment switch 58 and the above-mentioned power for a judgment 59. moreover, like [below-mentioned] While power OFF and power ON of a LCD mainframe are detected, the level of a relay-switch control signal is changed and opening and closing of the above-mentioned relay switch 60 are controlled, in power OFF Before turning off a relay switch 60, while the electric power supply for driving the liquid-crystal-display panel 1 is continued during the predetermined period through each power line 61-66-67-71-73, various enable signals are outputted through the various enable signal lines 70-72-75.
[0108] In the above-mentioned configuration, a power OFF detection means consists of a power control circuit 56, a judgment switch 58, and the power for a judgment 59, and a panel power hold means consists of a power control circuit 56, and the deletion means consists of the power control circuit 56, the control circuit for source drivers 54, a control circuit for gate drivers 55, a gate driver 53, and a counterelectrode signal-control circuit 57.
[0109] Next, the operation in the LCD which has the above-mentioned configuration when the judgment switch 58 is pushed by the user and ON/OFF of a LCD is directed is explained, referring to the wave form chart of the drawing 14 or the drawing 16 . In addition, drawing 16 is an enlarged view of a video signal and a counterelectrode signal having shown in drawing 15 .
[0110] First, the OFF->ON operation which makes the LCD of OFF status turn on is explained. If the judgment switch 58 is pushed once in the status that the LCD mainframe turns off, as shown in the wave form chart of drawing 14 , a judgment signal pulse will appear considerable the bottom in the term when the judgment switch is pushed on ON/OFF judging signal. The power control circuit 56 will make a relay-switch control signal H level, if this judgment signal pulse is detected. As for a relay switch 60, a relay-switch control signal will be in switch-on during the H level, the voltage from a main power supply is supplied to the power control circuit 56, the power control circuit 56 supplies a desired signal to each circuit, and a LCD mainframe turns it on. A relay-switch control signal maintains H level, and continues making it flow through a relay switch 60 here until the judgment switch 58 is next pushed and a judgment signal pulse is inputted.
[0111] Then, the ON->OFF operation which turns off the LCD of ON status is explained. If the

judgment switch 58 is pushed once in the status that the LCD turns on, as shown in the wave form chart of drawing 15 , a judgment signal pulse will appear again to ON/OFF judging signal. The power control circuit 56 carries out H level output of a source enable signal, a gate enable signal, and the opposite enable signal during a fixed period through the various above-mentioned enable signal lines 70-72-75, in order to eliminate a picture image, if this judgment signal pulse is detected.

[0112] In order to perform a usual display until various enable signals are set to H level, in the control circuit for source drivers 54, arbitrary video signals and a control signal are outputted to the source driver 52, and the counterelectrode signal the control signal which turns on a usual gate line one by one suited whose arbitrary video signals in the counterelectrode signal-control circuit 57 again is outputted in the control circuit for gate drivers 55, respectively.

[0113] And if various enable signals are set to H level, in the control circuit for gate drivers 55, a ****** bull pulse is generated based on the gate enable signal of H level, it outputs to the gate driver 53, the gate driver 53 makes the ****** bull pulse a gate driving signal as it is, and they are m gate lines 251-25m of the above-mentioned liquid-crystal-display panel 1. It outputs all at once simultaneously.

[0114] At this time, moreover, in the control circuit for source drivers 54 A source enable signal changes to the video signal of H level usual during the period. The square-wave signal of a counterelectrode signal which is shown in drawing 16 , an inphase, and this voltage level is outputted to the source driver 52. the source driver 52 the square-wave signal supplied -- the time of normal operation -- the same -- a horizontal synchronizing signal -- synchronizing -- 241-24n of the n sources lines of the aforementioned liquid-crystal-display panel 1 It outputs all at once.

[0115] Moreover, in the counterelectrode signal-control circuit 57, the square-wave signal of the square-wave signal outputted from the above-mentioned control circuit for source drivers 54 which an opposite enable signal shows in drawing 16 during the H level, an inphase, and this voltage level is outputted as a counterelectrode signal.

[0116] The voltage impressed to each pixel 22 is relatively set to 0V by this, the liquid crystal of each pixel 22 will be in the status that it does not impress, all at once, the light is put out completely and the after-image of liquid crystal is eliminated. Thus, in case it drives so that the liquid-crystal-display panel 1 may be made to switch off completely, it is 251-25m of all gate lines. With the configuration which carries out simultaneous ON of all upper TFT23, since the time which the above-mentioned deletion operation takes is possible from shortest 1 / 2 level term, the after-image deletion of it is attained in very short time.

[0117] Then, after the liquid crystal of each pixel 22 is in the status that it was fully stabilized, the power control circuit 56 switches the various aforementioned enable signals to L level (0 level), makes a relay-switch control signal L level (0 level), presupposes un-flowing a relay switch 60, and stops the electric power supply from a main power supply.

[0118] In addition, although a video signal and a counterelectrode signal are made into a square-wave signal and each polarity of a video signal and a counterelectrode signal is reversed for every 1 level term here For example, as it considers only as the dc component of a voltage (off-level) lower than the threshold voltage of the liquid crystal in which the liquid crystal of the liquid-crystal-display panel 1 turns off a video signal as shown in drawing 17 or it is shown in drawing 18 About a video signal and a counterelectrode signal, both are good also as 0V signal, and should just be in the status lower than the threshold voltage of the liquid crystal which liquid crystal does not turn [the voltage impressed to each pixel 22 as a result] on relatively.

[0119] Then, the example of the gate driver 53 of a circuit for carrying out the above deletion operations and the example of a circuit of the video-signal processing section in the control circuit for source drivers 54 are explained using the drawing 19 or the drawing 24 .

[0120] One example of the gate driver 53 is shown in drawing 19 . The shift register 101, the level shifter 102, and the buffer circuit 103 are carried in this gate driver as standard structure of a gate driver. A shift register 101 and ** ** ******** 102 are m step configurations, respectively. the 1st in a shift register 101 (1011-101m) -- step 1011 A vertical synchronizing signal is supplied to a data terminal as a start signal (SP). A horizontal synchronizing signal is supplied to the clock

terminal of each card row as a clock signal (CK). It is outputted from the output terminal of each card row, and it is inputted into each card row of a level shifter 102 (1021-102m), and a level shifter 102 adjusts to suitable level, and the pulse by which 1 level term [every] sequential retardation of the start signal (one vertical synchronizing signal) was carried out outputs to a buffer circuit 103.

[0121] And in order to perform the above deletion operations, the buffer circuit 103 of the last card row consists of the 2 input OR gate 104 (1041-104m), as for one of the inputs of the OR gate 104, the output of a level shifter 102 is connected, and, as for another input, the ****** bull pulse signal line 65 is connected here.

[0122] The wave form chart of the important section of the gate driver which has such a configuration is shown in drawing 20 . The output of the level shifter 102 in which the output of each OR gate 104 which constitutes a buffer circuit 103, i.e., the output of a gate driver, turns on m gate lines one by one is outputted as it is at the time of normal operation. The level conversion of the above-mentioned pulse as which this is a usual gate driving signal, and was inputted by the gate driver 7 is carried out, and it is 251-25m of the gate lines of the liquid-crystal-display panel 1. It outputs (refer to the drawing 2).

[0123] On the other hand, if a ****** bull pulse is inputted from the ****** bull pulse signal line 65, from each OR gate 104, it will change to the output of a level shifter 102, and the ****** bull pulse itself will be outputted. Thereby, it is 251-25m of the gate lines of the liquid-crystal-display panel 1. All upper TFT23 will be turned on all at once.

[0124] Other examples of the gate driver 53 are shown in drawing 21 . The shift register 101, the level shifter 102, and the buffer circuit 105 are carried also for this gate driver. And in order to perform the above-mentioned deletion drive, the presetting terminal 106 is formed in a shift register 101, and it has become the configuration that the aforementioned ****** bull pulse is inputted into this presetting terminal 106 here.

[0125] The wave form chart of the important section of the gate driver which has such a configuration is shown in drawing 22 . Although the output from a shift register 101 is an output which turns on the m above-mentioned gate lines one by one at the time of normal operation, if a ****** bull pulse is inputted into the presetting terminal 106, regardless of the input of a shift register 101, each outputs of a total of m steps of a shift register 101 will serve as H level all at once. The control circuit for gate drivers 55 is made not to output control signals other than a ****** bull pulse to the gate driver 53 here, when a gate enable signal is set to H level.

[0126] The example of 1 circuit of the video-signal processing section in the control circuit for source drivers 54 is shown in drawing 23 . In this, it is with a flip-flop 107 and the inverter 113, and 2 dividing signal of a horizontal synchronizing signal is created, and a level shifter 108 changes this 2 dividing signal into the signal of a counterelectrode signal, an inphase, and this voltage level. And 3 terminal buffer 109-110 and the inverter 112 are that the signal outputted from the OR gate 111 is inputted into a source enable signal, and it changes from the output from the signal distribution circuit which was prepared for every color in the control circuit for source drivers and not to illustrate to this signal changed by the level shifter 108. The wave form chart of the video-signal processing section which has such a configuration is shown in drawing 24 .

[0127] In addition, although the case where omit a control of a counterelectrode signal and only a video signal is controlled in an explanation here is indicated As a counterelectrode signal may be controlled similarly and shown above, a video signal and a counterelectrode signal to origin If the voltage impressed to liquid crystal as a result turns into a voltage lower than the threshold which liquid crystal does not turn on relatively, it cannot be overemphasized that the combination which becomes the voltage on which the deletion effect is acquired, a video signal and a counterelectrode signal are signals of only a dc component, and liquid crystal does not turn them on relatively is sufficient.

[0128] It is as follows if other gestalt of the operation concerning the [gestalt 6 of operation] this invention is explained based on drawing 25 and the drawing 26 . In addition, the same sign is appended to the member of an explanation shown with the gestalt of the aforementioned operation, and the member which has the same function for convenience, and the explanation is

omitted.
[0129] In the LCD of the gestalt 5 of the above-mentioned operation, as shown in drawing 13 , the gate enable signal was supplied to the control circuit for gate drivers 55 through the gate enable signal line 72 from the power control circuit 56, and the control circuit for gate drivers 55 generated the gate ****** bull pulse based on this, and supplied this to the gate driver 53 through the ****** bull pulse signal line 65.
[0130] On the other hand, in the LCD of the gestalt of this operation, as shown in drawing 25 , the power control circuit 81 does not output a gate enable signal, and supply of the gate enable signal to the control circuit for gate drivers 80 is not performed. Supply of an enable signal is performed only in the control circuit for source drivers 54, and the counterelectrode signal-control circuit 57. So to speak, the control circuit for these gates drivers 80 and the gate driver 82 by the side of the gate are a certain circuit arrangement from the former itself.
[0131] Therefore, the deletion means consists of a power control circuit 81, a control circuit for source drivers 54, and a counterelectrode signal-control circuit 57 here.
[0132] The wave form chart of the important section at the time of an operation of ON->OFF of the LCD in the LCD of the gestalt of this operation which has such a configuration is shown in drawing 26 .
[0133] As shown in drawing 26 , the video signal outputted from the control circuit for source drivers 54, and the counterelectrode signal outputted from the counterelectrode signal-control circuit 57 Until the judgment switch 58 is pushed and a source enable signal and an opposite enable signal are set to H level like the LCD of the gestalt 5 of operation It is a usual video signal and a usual counterelectrode signal, and if the above-mentioned enable signal changes to H level, it will change to a usual video signal and a usual counterelectrode signal, and will become the square-wave signal of an inphase and this voltage level mutually.
[0134] And the gate driving signal outputted from the gate driver 82 is the output same succeedingly usually as the time of a display, and differing is 251-25m of gate lines. It is the point which continues the operation which turns on upper TFT23 one by one every gate line 25.
[0135] According to this, the voltage impressed to each pixel 22 is relatively set to 0V in 1 perpendicular term, the liquid crystal of each pixel 22 will be in the status that it does not impress, the light will be put out completely and the after-image of liquid crystal will be eliminated (refer to the drawing 2).
[0136] Thus, since the <TXF FR=0002 HE=250 WI=080 LX=1100 LY=0300> time taken to eliminate an after-image is 1 perpendicular term need at least, although it becomes long with the configuration which does not input a gate enable signal into a gate side compared with the LCD of the gestalt 5 of operation, the gate driver 82 by the side of the gate and the control circuit for gate drivers 80 have the advantage that it can correspond with the existing configuration.
[0137] In addition, the wave of a video signal and a counterelectrode signal should just be in the status that the voltage impressed to each pixel 22 as a result is lower than the threshold voltage of the liquid crystal which liquid crystal does not turn on relatively also here.
[0138] It is as follows if other gestalt of the operation concerning the [gestalt 7 of operation] this invention is explained based on the drawing 27 or the drawing 30 . In addition, the same sign is appended to the member of an explanation shown with the gestalt of the aforementioned operation, and the member which has the same function for convenience, and the explanation is omitted.
[0139] In the LCD of the gestalt 5 of the above-mentioned operation, the control circuit for gate drivers 55 If H level of the gate enable signal line 72 is inputted from the power control circuit 56 A ****** bull pulse is supplied to the gate driver 53 through the ****** bull pulse signal line 65. the gate driver 53 In a ****** bull pulse being inputted, it changes to a usual gate driving signal, and is 251-25m of all gate lines all at once as it is about this ****** bull pulse. It was outputting upwards.
[0140] On the other hand, in the LCD of the gestalt of this operation, as shown in drawing 27 , the control circuit for gate drivers 85 will output the gate enable signal of H level through the gate-control signal line 64 as a start signal (SP) of the gate driver 82, if the gate enable signal of H

level is inputted from the power control circuit 56.
[0141] That is, the deletion means consists of a power control circuit 56, a control circuit for source drivers 54, and a control circuit for gate drivers 85 here.
[0142] The wave form chart of the important section at the time of an operation of ON->OFF of the LCD in the LCD of the gestalt of this operation which has such a configuration is shown in drawing 28 .
[0143] As shown in drawing 28 , the video signal outputted from the control circuit for source drivers 54, and the counterelectrode signal outputted from the counterelectrode signal-control circuit 57 Until the judgment switch 58 is pushed and a source enable signal and an opposite enable signal are set to H level like the LCD of the gestalt 5 of operation It is a usual video signal and a usual counterelectrode signal, and if the above-mentioned enable signal changes to H level, it will change to a usual video signal and a usual counterelectrode signal, and will become the square-wave signal of an inphase and this voltage level mutually.
[0144] And for the term of H level, the gate driving signal to which differing is outputted from the gate driver 82 is [a gate enable signal] the point which serves as H level output much. It depends for the voltage value of this H level on supply voltage.
[0145] According to this, in 1 perpendicular term, the voltage impressed to each pixel 22 is relatively set to 0V, the liquid crystal of each pixel 22 will be in the status that it does not impress, all at once, the light will be put out completely and the after-image of liquid crystal will be eliminated (refer to the drawing 2).
[0146] Thus, time which a deletion operation takes the output of the gate driver 82 rather than the configuration of the gestalt 6 of operation although it is not the configuration of the gestalt 5 of the above-mentioned operation with the configuration which fixes to a fixed voltage while being inputted into the gate enable signal can be shortened. And the gate driver 82 also has the advantage that it can correspond with the existing configuration.
[0147] In addition, the wave of a video signal and a counterelectrode signal should just be in the status that the voltage impressed to each pixel 22 as a result is lower than the threshold voltage of the liquid crystal which liquid crystal does not turn on relatively also here.
[0148] Then, the example of a circuit of the control circuit for gate drivers 85 which can perform the above drives is explained using drawing 29 and the drawing 30 .
[0149] An example of the control circuit for gate drivers 85 is shown in drawing 29 . The control circuit for gate drivers carries control IC121 standardly, and is creating the signal for controlling a gate driver by the clock signal inputted, the horizontal synchronizing signal, the vertical synchronizing signal, etc. The output of the start signal of the control signal (SP') and the gate enable signal obtained from the aforementioned gate enable signal line are inputted into the OR gate 122, and let the output be a new start signal (SP). The above deletion operations are attained by this start signal.
[0150] Moreover, although considered as the configuration using a dry element battery, a button cell, etc. as power for a judgment 59, while a battery charger is adopted and the LCD mainframe is operating as power for a judgment 59 in the gestalt 5-6-7 of the above-mentioned operation in addition to this, it is good also as a configuration which charges this battery charger from the main power supply for driving a mainframe. Since the battery charger is especially adopted from the first, a notebook computer, a gestalt information terminal, etc. are considering as such a configuration, and become unnecessary to have a button cell, a dry element battery, etc. separately.
[0151] Furthermore, apart from the voltage supplied from the main-power-supply line 76, if the format of supplying an AC power to the power for a judgment 59 is taken, it becomes unnecessary to always [, such as a desktop type information terminal,] have a button cell, a dry element battery, etc. by the case of the LCD which has obtained the main power supply from the AC power etc. as well as the configuration using a battery charger separately. And if a small cell is beforehand carried in this case supposing the times of a halt of unexpected current supply, such as electric-power-failure etc., in addition, it is desirable.
[0152] It is common to perform a control of ON/OFF (above, it is expressed as ON/OFF of

power) of the power of the so-called consumer electronics by pushing the key switch of the non-locking formula which performs connection or a disconnection systematically [a baton switch etc.] not like a lock-type switch, such as a toggle switch, but like the above-mentioned judgment switch 58. If the key switch is pushed, this method outputs a strobe signal from an output terminal, it inputs into an input terminal, and the signal is the configuration which carries out ON/OFF of the power output, and can be easily realized in such a configuration by having mentioned above delaying the power cut from a main power supply during a fixed period at the time of an operation of ON->OFF.

[0153]

[Effect of the Invention] As mentioned above, the eraser of the liquid-crystal-display picture image of this invention according to claim 1 The LCD which has the liquid-crystal-display panel driven with an active element is equipped with a pixel. A power OFF detection means to be the eraser of the display image which makes the display image of a liquid-crystal-display panel eliminate at the time of power OFF of a LCD mainframe, and to detect that the power of a LCD mainframe was turned off, A panel power hold means to hold the power power supplied to a liquid-crystal-display panel after turning off the power of a LCD mainframe during a fixed period, When power OFF is detected with the above-mentioned power OFF detection means, it is the configuration of having the deletion means which is made turning on the above-mentioned liquid-crystal-display panel completely in a liquid crystal saturation voltage, and is made switching off completely continuously after that in the electric power supply from the above-mentioned panel power hold means.

[0154] By this, since the picture image of halftone is displayed on a liquid-crystal-display panel even if, a saturation voltage is once impressed to the liquid crystal of a liquid-crystal-display panel as the strain of liquid crystal is small and the energy for a restoration is small, and the energy for a restoration is fully raised, liquid crystal will return to the original status quickly by subsequent complete putting out lights, and an after-image will be eliminated quickly. And I understand that the charge of the liquid crystal held by an after-image being eliminated quickly, i.e., a short time, discharges, it is, and a degradation of the liquid crystal by abnormal voltage can also be suppressed.

[0155] Consequently, the effect of enabling it to improve certainly the problem of a degradation of the liquid crystal at the time of power OFF and aggravation of display quality is done so.

[0156] The eraser of the liquid-crystal-display picture image of this invention according to claim 2 is the configuration that the voltage impressed to liquid crystal in case the above-mentioned deletion means is continuously switched off completely after complete lighting drives a liquid-crystal-display panel so that it may become the voltage which liquid crystal turns off, in the configuration of a claim 1.

[0157] Since an after-image can be made by this to eliminate still more quickly than the configuration of a claim 1, as a result, the effect of enabling it to improve more the problem of a degradation of the liquid crystal at the time of power OFF and aggravation of display quality to an authenticity is done so.

[0158] The eraser of the liquid-crystal-display picture image of this invention according to claim 3 In the configuration of a claim 2 the above-mentioned deletion means The gate driving signal which turns on a fixed term more than 1 perpendicular term and a gate line one by one, and turns on an active element for every gate line from a gate driver is made to output. A video signal which is completely turned on from a source driver in this term is made to output. It is the configuration to which the gate driving signal which turns on a fixed term more than 1 perpendicular term and a gate line one by one from a gate driver, and turns on an active element for every gate line is made to output, and a video signal which is completely switched off from a source driver in this term is made to output continuously after that.

[0159] It is possible for the configuration by the side of the gate to remain as it is, and to realize by this, the deletion means indicated to the claim 2 easily by the configuration change by the side of the source.

[0160] The eraser of the liquid-crystal-display picture image of this invention according to claim 4

In the configuration of a claim 2 the above-mentioned deletion means The gate side compensation means to which the gate driving signal which makes the vertical-retrace-line term within 1 perpendicular term turn on the active element on [all] a gate line simultaneously from a gate driver is made to output, It is the configuration of having the source side compensation means to which a video signal which is turned on completely is made outputting from a source driver so that it may synchronize with the gate driving signal outputted from this gate side compensation means, and making 1 vertical-retrace-line term turning on a liquid-crystal-display panel completely.

[0161] By this, since complete lighting at the time of power OFF of a LCD mainframe is performed using the vertical-retrace-line term of 1 perpendicular term, although a configuration needs to be changed for both by the side of the source and the gate The after-image of liquid crystal can be eliminated still more quickly than the configuration of a claim 3 which complete lighting and complete putting out lights of a liquid-crystal-display panel of were attained within 1 perpendicular term, and was described above, and the effect that a degradation of liquid crystal can be suppressed still effectively is done so.

[0162] The eraser of the liquid-crystal-display picture image of this invention according to claim 5 In the configuration of a claim 2 the above-mentioned deletion means The gate side compensation means to which a gate driving signal which the vertical-retrace-line term and this period within 1 perpendicular term are exceeded [driving signal], and makes the active element on [all] a gate line turn on simultaneously from a gate driver is made to output, As it synchronizes with the gate driving signal outputted from this gate side compensation means, it is the configuration of having the source side compensation means to which a video signal which turns on completely and is switched off completely continuously is made outputting from a source driver.

[0163] Since complete lighting and complete putting out lights at the time of power OFF of a LCD mainframe can carry out by this in the term when it is still short than 1 perpendicular term, although a configuration needs to be changed for both by the side of the source and the gate, the after-image of liquid crystal can be eliminated still more quickly than the above-mentioned configuration of a claim 4, and the effect that a degradation of liquid crystal can be suppressed still effectively is done so.

[0164] The eraser of the liquid-crystal-display picture image of this invention according to claim 6 is a configuration allotted to the input side of a video-signal distribution means to distribute the compound video signal with which the above-mentioned source side compensation means consists of a video signal of two or more colors to a monochromatic video signal for every color in the claim 4 and the configuration of 5.

[0165] Thereby, in addition to the claim 4 and the effect by the configuration of 5, compared with the configuration which prepared the source side compensation means in the output side of a video-signal distribution means, the configuration of a source side compensation means does so the effect that it is simple and the eraser itself can be made small.

[0166] The eraser of the liquid-crystal-display picture image of this invention according to claim 7 The LCD which has the liquid-crystal-display panel driven with an active element is equipped with a pixel. A power OFF detection means to be the eraser of the display image which makes the display image of a liquid-crystal-display panel eliminate at the time of power OFF of a LCD mainframe, and to detect that the power of a LCD mainframe was turned off, A panel power hold means to hold the power power supplied to a liquid-crystal-display panel after turning off the power of a LCD mainframe during a fixed period, When power OFF is detected with the above-mentioned power OFF detection means, it is the configuration of having a deletion means to drive a liquid-crystal-display panel and to make a liquid-crystal-display panel switch off completely in the electric power supply from the above-mentioned panel power hold means so that the voltage impressed to liquid crystal may turn into the voltage which liquid crystal turns off.

[0167] By this, when the power of a LCD mainframe is turned off, while a deletion means turns on an active element The voltage positively impressed to liquid crystal at a video signal or a counterelectrode signal controls so that liquid crystal serves as the voltage to turn off, and a liquid-crystal-display panel by making the light put out completely I understand that the charge of

the liquid crystal held by an after-image being eliminated quickly and an after-image being eliminated quickly, i.e., a short time, discharges, it is, and a degradation of the liquid crystal by abnormal voltage can also be suppressed.
[0168] Consequently, the effect of enabling it to improve certainly the problem of a degradation of the liquid crystal at the time of power OFF and aggravation of display quality is done so.
[0169] The eraser of the liquid-crystal-display picture image of this invention according to claim 8 In the configuration of a claim 7 the above-mentioned deletion means The gate driving signal which turns on a gate line one by one and turns on an active element for every gate line from a gate driver is made to output. And it is the configuration made to output from a source driver and a counterelectrode signal-control circuit, respectively as a voltage on which liquid crystal turns off the counterelectrode signal impressed to the counterelectrode of the video signal and liquid-crystal-display panel which are impressed to a pixel electrode.
[0170] The effect that the time which a deletion operation takes is possible from shortest 1 / 2 level term, and can eliminate an after-image in very short time by this is done so.
[0171] It is the configuration made to output from a source driver and a counterelectrode signal-control circuit, respectively as a voltage on which liquid crystal turns off the counterelectrode signal impressed to the counterelectrode of the video signal and liquid-crystal-display panel which the eraser of the liquid-crystal-display picture image of this invention according to claim 9 makes output the gate driving signal which the above-mentioned deletion means makes turn on the active element on [all] a gate line simultaneously from a gate driver in the configuration of a claim 7, and are impressed to a pixel electrode.
[0172] Although the time which this takes to eliminate an after-image becomes long compared with the configuration of a claim 8, a gate driver required to output a gate driving signal, its control circuit, etc. do so the effect that it can correspond with the existing configuration.
[0173] The eraser of the liquid-crystal-display picture image of this invention according to claim 10 In the configuration of a claim 7 the above-mentioned deletion means The gate driving signal fixed to the power potential supplied to a gate driver is made to output to all gate lines from a gate driver. And it is the configuration made to output from a source driver and a counterelectrode signal-control circuit, respectively as a voltage on which liquid crystal turns off the counterelectrode signal impressed to the counterelectrode of the video signal and liquid-crystal-display panel which are impressed to a pixel electrode.
[0174] Thereby, rather than the configuration of a claim 9, time which a deletion operation takes can be shortened and, moreover, the effect that a gate driver required to output a gate driving signal can be corresponded with the existing configuration is done so.
[0175] The eraser of the liquid-crystal-display picture image of this invention according to claim 11 In the claims 1 and 2 or the configuration of 7, the switch of the power prepared in the above-mentioned LCD mainframe It is the configuration which outputs a judgment pulse for every one switch operation. the above-mentioned power OFF detection means It detects that the power of a LCD mainframe was turned off when this judgment pulse was inputted in the status that the LCD mainframe is turned on. a panel power hold means When OFF of power is detected with the above-mentioned power OFF detection means, it is the configuration of making it turning off after predetermined carries out time progress of the switch means arranged on the main-power-supply line which performs electrode supply from a main-power-supply means on a LCD mainframe.
[0176] Thereby, without establishing a panel power hold means for auxiliary power etc. separately, it can realize systematically and is a configuration corresponding to the power ON/OFF control of consumer electronics. Consequently, the effect that large-sized-izing and the cost rise of the LCD [itself] by carrying such an eraser are avoidable is done so.
[0177] The LCD of this invention according to claim 12 is a reflected type LCD which displays on the claim 1 or either of 11 by reflecting the incident light equipped with the eraser of the liquid-crystal-display picture image of a publication from the exterior. Thereby, the reflected type LCD which was excellent in display quality is realizable.
[0178] The LCD of this invention according to claim 13 is a LCD equipped with the eraser of the claim 1 or a liquid-crystal-display picture image given in either of 11 which has a guest host type

liquid-crystal-display panel. Thereby, the guest host type LCD which was excellent in display quality is realizable.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] The LCD which has the liquid-crystal-display panel driven with an active element is equipped with a pixel. A power OFF detection means to be the eraser of the display image which makes the display image of a liquid-crystal-display panel eliminate at the time of power OFF of a LCD mainframe, and to detect that the power of a LCD mainframe was turned off, A panel power hold means to hold the power power supplied to a liquid-crystal-display panel after turning off the power of a LCD mainframe during a fixed period, The eraser of the liquid-crystal-display picture image characterized by having the deletion means which is made to turn on the above-mentioned liquid-crystal-display panel completely in a liquid crystal saturation voltage, and is made to switch off completely continuously after that in the electric power supply from the above-mentioned panel power hold means if power OFF is detected with the above-mentioned power OFF detection means.

[Claim 2] The above-mentioned deletion means is the eraser of the liquid-crystal-display picture image according to claim 1 characterized by driving a liquid-crystal-display panel so that the voltage impressed to liquid crystal may turn into the voltage which liquid crystal turns off, in case the light is continuously put out completely after complete lighting.

[Claim 3] The above-mentioned deletion means from a gate driver A fixed term more than 1 perpendicular term, The gate driving signal which turns on a gate line one by one and turns on an active element for every gate line is made to output. A video signal which is completely turned on from a source driver in this term is made to output. The gate driving signal which turns on a fixed term more than 1 perpendicular term and a gate line one by one, and turns on an active element for every gate line from a gate driver continuously after that is made to output. The eraser of the liquid-crystal-display picture image given in two characterized by making a video signal which is completely switched off from a source driver in this term output.

[Claim 4] The gate side compensation means to which the gate driving signal in which the above-mentioned deletion means makes the vertical-retrace-line term within 1 perpendicular term turn on the active element on [all] a gate line simultaneously from a gate driver is made to output, It has the source side compensation means to which a video signal which is completely turned on so that it may synchronize with the gate driving signal outputted from this gate side compensation means is made to output from a source driver. The eraser of the liquid-crystal-display picture image according to claim 2 characterized by making 1 vertical-retrace-line term turn on a liquid-crystal-display panel completely.

[Claim 5] The gate side compensation means to which a gate driving signal which the above-mentioned deletion means exceeds [driving signal] the vertical-retrace-line term and this period within 1 perpendicular term from a gate driver, and makes the active element on [all] a gate line turn on simultaneously is made to output, The eraser of the liquid-crystal-display picture image according to claim 2 characterized by having the source side compensation means to which a video signal which turns on completely and is switched off completely continuously is made to output from a source driver so that it may synchronize with the gate driving signal outputted from this gate side compensation means.

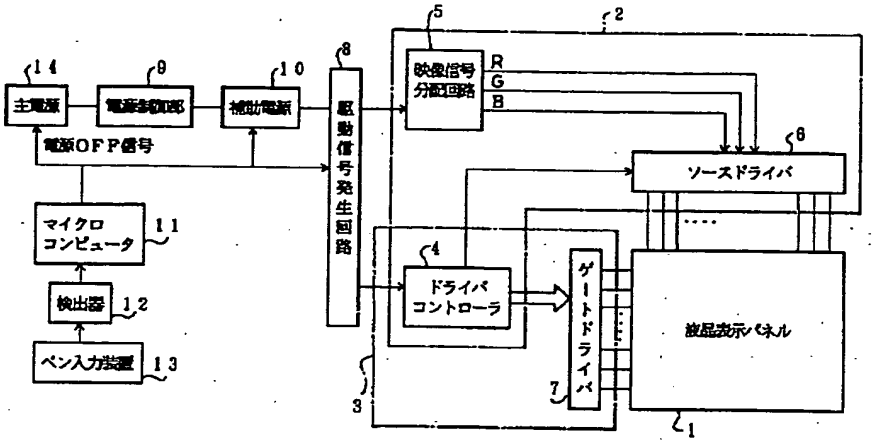
[Claim 6] The eraser of the liquid-crystal-display picture image according to claim 4 or 5

characterized by being allotted to the input side of a video-signal distribution means to distribute the compound video signal with which the above-mentioned source side compensation means consists of a video signal of two or more colors to a monochromatic video signal for every color.
[Claim 7] The LCD which has the liquid-crystal-display panel driven with an active element is equipped with a pixel. A power OFF detection means to be the eraser of the display image which makes the display image of a liquid-crystal-display panel eliminate at the time of power OFF of a LCD mainframe, and to detect that the power of a LCD mainframe was turned off, A panel power hold means to hold the power power supplied to a liquid-crystal-display panel after turning off the power of a LCD mainframe during a fixed period, When power OFF is detected with the above-mentioned power OFF detection means, in the electric power supply from the above-mentioned panel power hold means The eraser of the liquid-crystal-display picture image characterized by having a deletion means to drive a liquid-crystal-display panel and to make a liquid-crystal-display panel switch off completely so that the voltage impressed to liquid crystal may turn into the voltage which liquid crystal turns off.
[Claim 8] The above-mentioned deletion means is the eraser of the liquid-crystal-display picture image according to claim 7 characterized by making it output from a source driver and a counterelectrode signal-control circuit, respectively as a voltage on which liquid crystal turns off the counterelectrode signal impressed to the counterelectrode of the video signal and liquid-crystal-display panel which are made to output the gate driving signal which turns on a gate line one by one and turns on an active element for every gate line from a gate driver, and are impressed to a pixel electrode.
[Claim 9] The above-mentioned deletion means is the eraser of the liquid-crystal-display picture image according to claim 7 characterized by making it output from a source driver and a counterelectrode signal-control circuit, respectively as a voltage on which liquid crystal turns off the counterelectrode signal impressed to the counterelectrode of the video signal and liquid-crystal-display panel which are made to output the gate driving signal which makes the active element on [all] a gate line turn on simultaneously from a gate driver, and are impressed to a pixel electrode.
[Claim 10] The above-mentioned deletion means is the eraser of the liquid-crystal-display picture image according to claim 7 characterized by making it output from a source driver and a counterelectrode signal-control circuit, respectively as a voltage on which liquid crystal turns off the counterelectrode signal impressed to the counterelectrode of the video signal and liquid-crystal-display panel which are made to output the gate driving signal fixed to the power potential supplied to a gate driver to all gate lines from a gate driver, and are impressed to a pixel electrode.

[Claim 11] The switch of the power prepared in the above-mentioned LCD mainframe It is the configuration which outputs a judgment pulse for every one switch operation. the above-mentioned power OFF detection means It detects that the power of a LCD mainframe was turned off when this judgment pulse was inputted in the status that the LCD mainframe is turned on. a panel power hold means If OFF of power is detected with the above-mentioned power OFF detection means, the switch means arranged on the main-power-supply line which performs electrode supply from a main-power-supply means on a LCD mainframe The eraser of the liquid-crystal-display picture image according to claim 1, 2, or 7 characterized by being the configuration made to turn off after predetermined carries out time progress.
[Claim 12] The reflected type LCD which displays on the claim 1 or either of 11 by reflecting the incident light equipped with the eraser of the liquid-crystal-display picture image of a publication from the exterior.
[Claim 13] The LCD which has the guest host type liquid-crystal-display panel which equipped the claim 1 or either of 11 with the eraser of the liquid-crystal-display picture image of a publication.

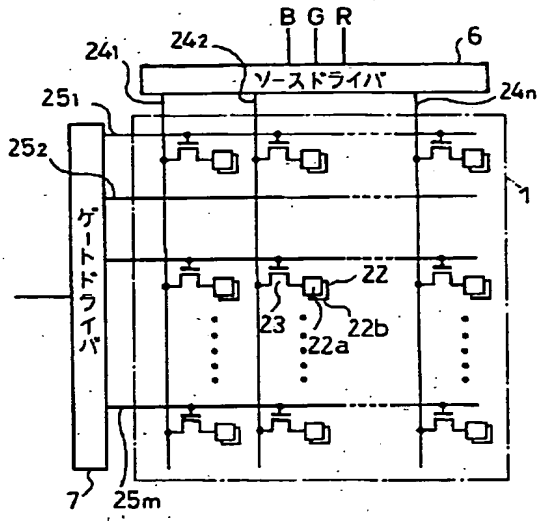
[Translation done.]

Drawing selection Drawing 1



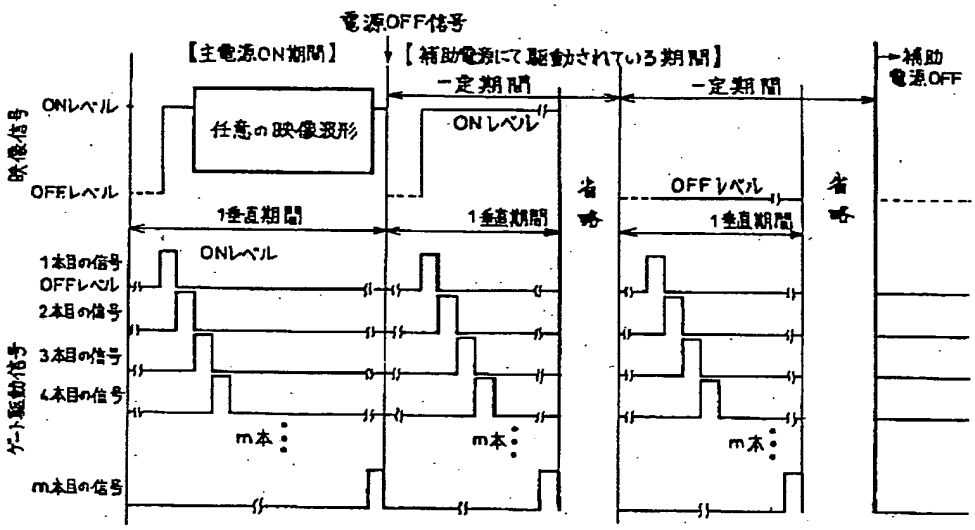
[Translation done.]

Drawing selection Drawing 2



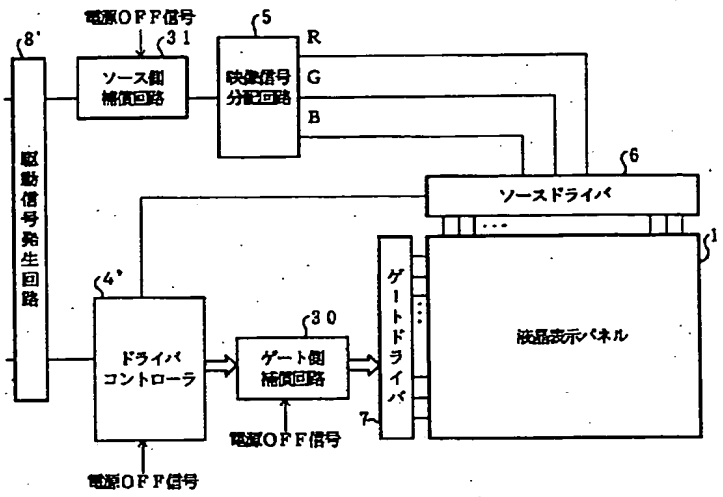
[Translation done.]

Drawing selection Drawing 3



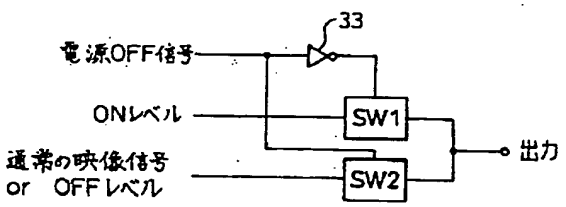
[Translation done.]

Drawing selection Drawing 4



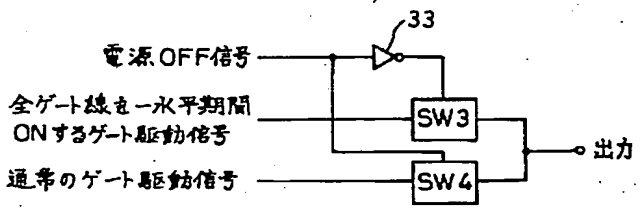
[Translation done.]

Drawing selection Drawing 5



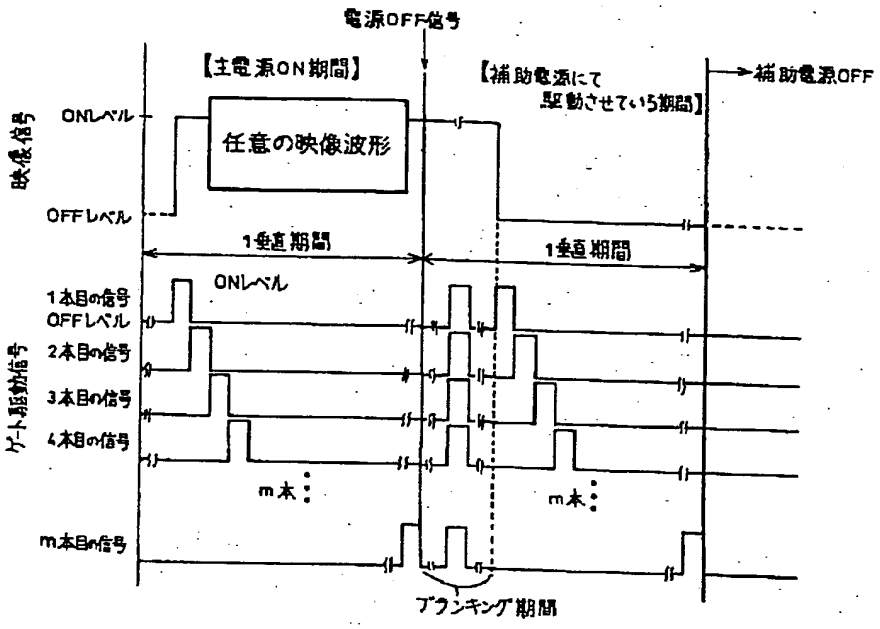
[Translation done.]

Drawing selection Drawing 6



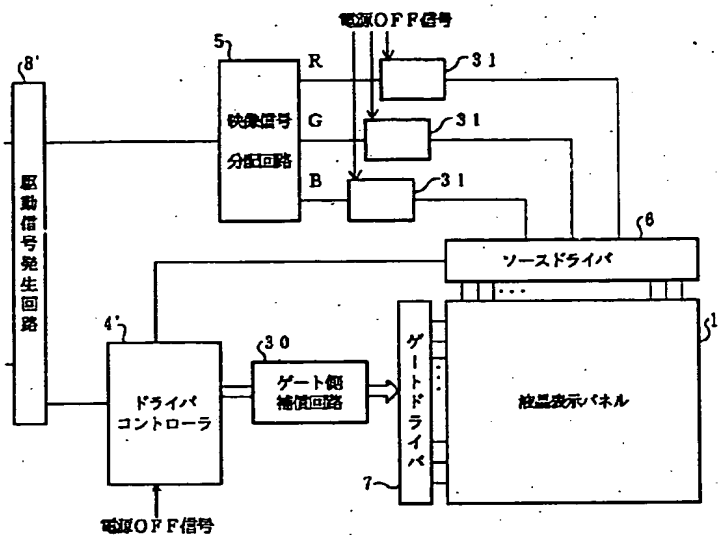
[Translation done.]

Drawing selection Drawing 7



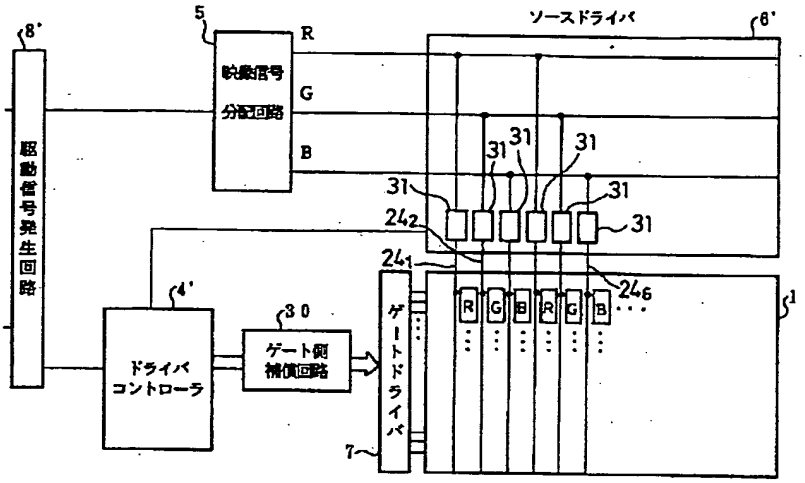
[Translation done.]

Drawing selection Drawing 8



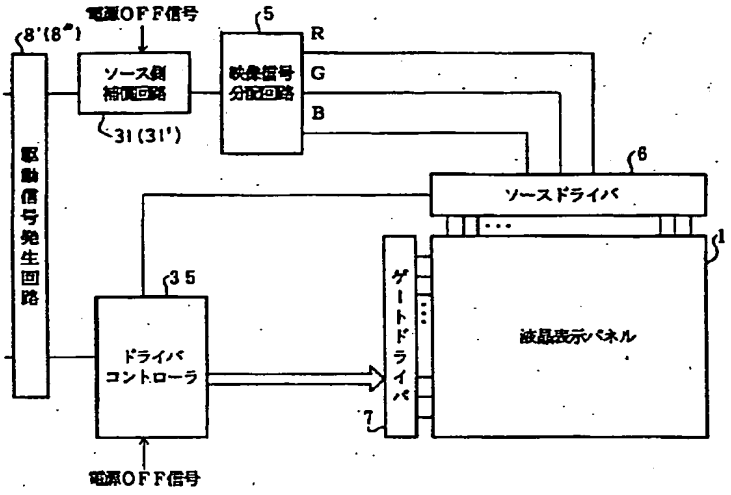
[Translation done.]

Drawing selection Drawing 9



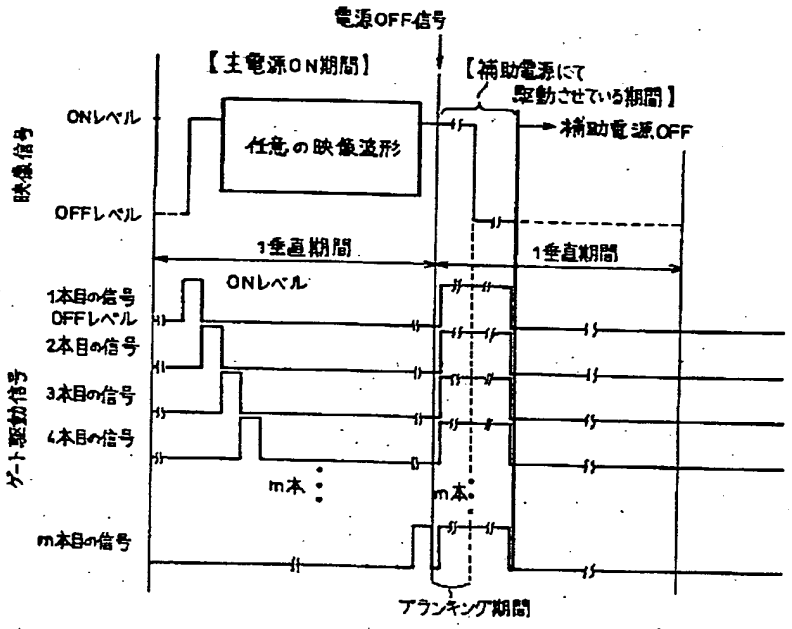
[Translation done.]

Drawing selection Drawing 10



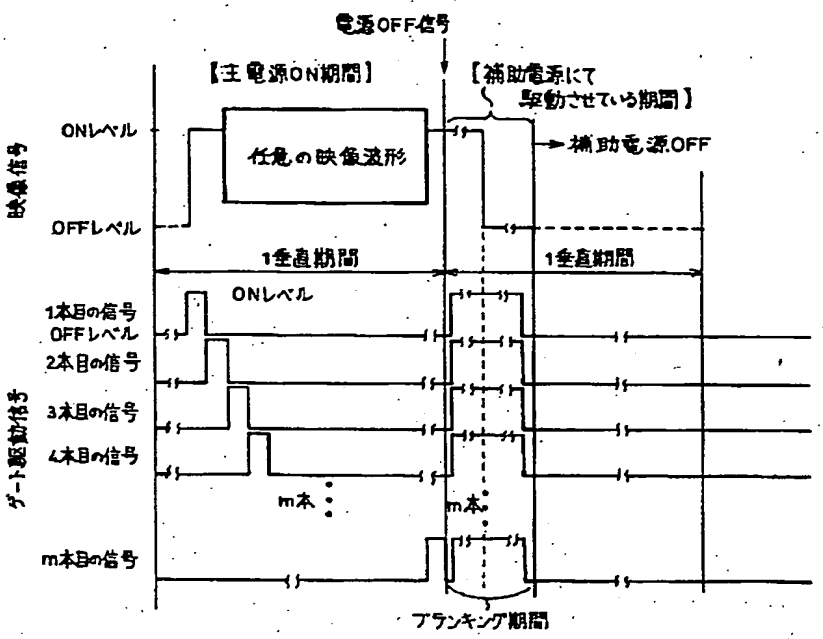
[Translation done.]

Drawing selection Drawing 11



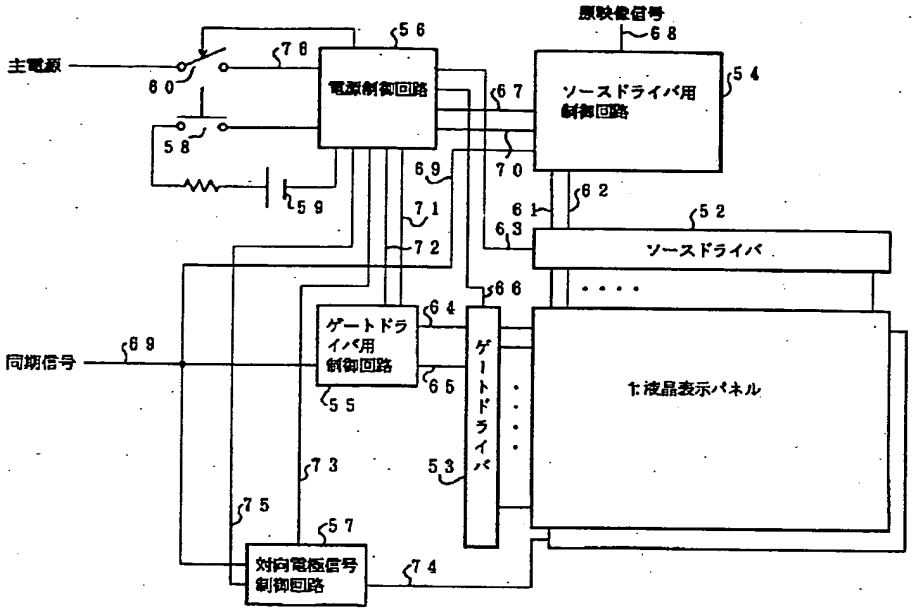
[Translation done.]

Drawing selection Drawing 12



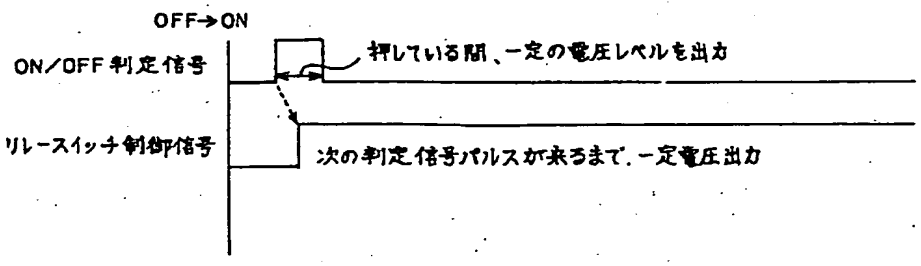
[Translation done.]

Drawing selection Drawing 13



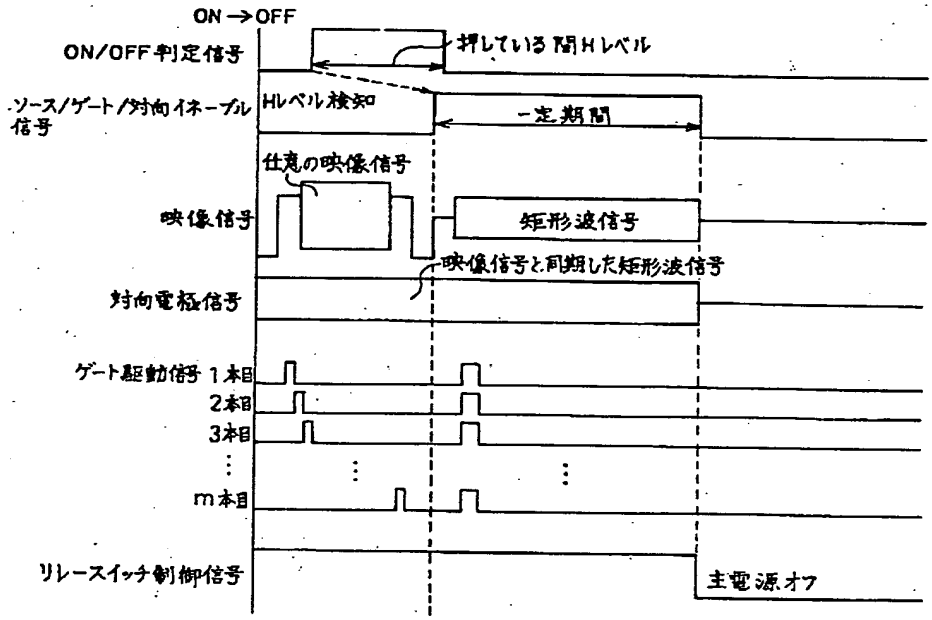
[Translation done.]

Drawing selection Drawing 14



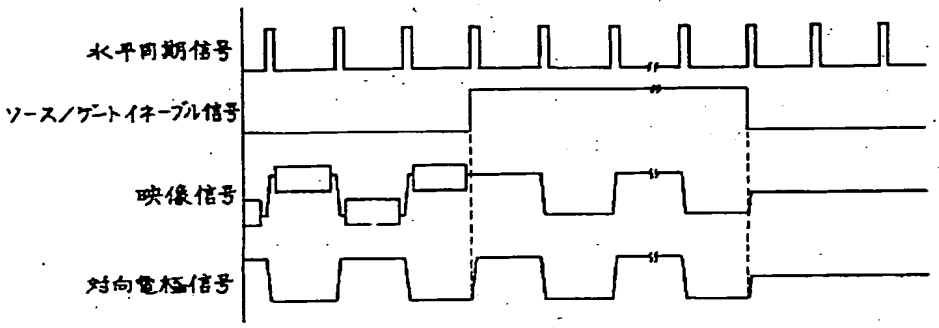
[Translation done.]

Drawing selection Drawing 15



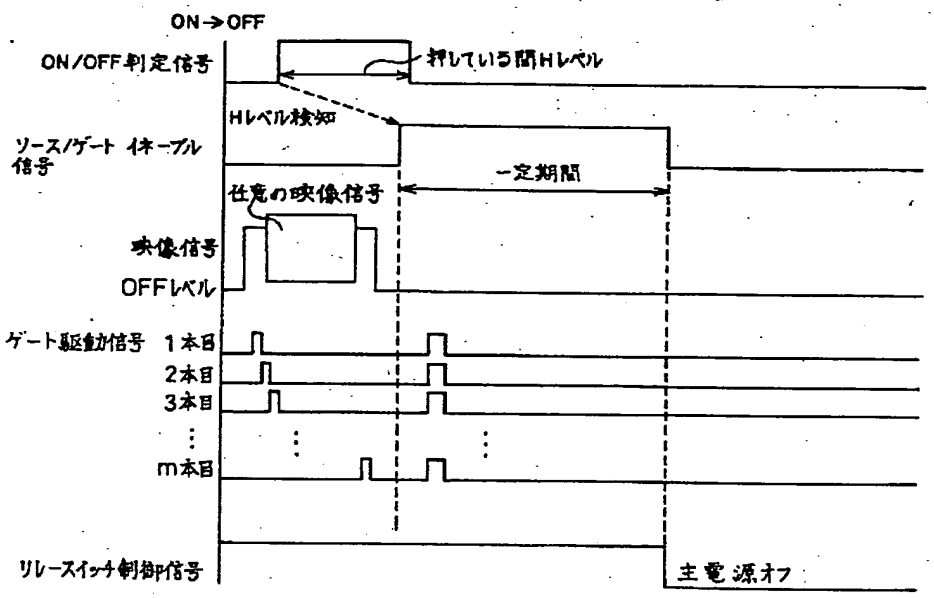
[Translation done.]

Drawing selection Drawing 16



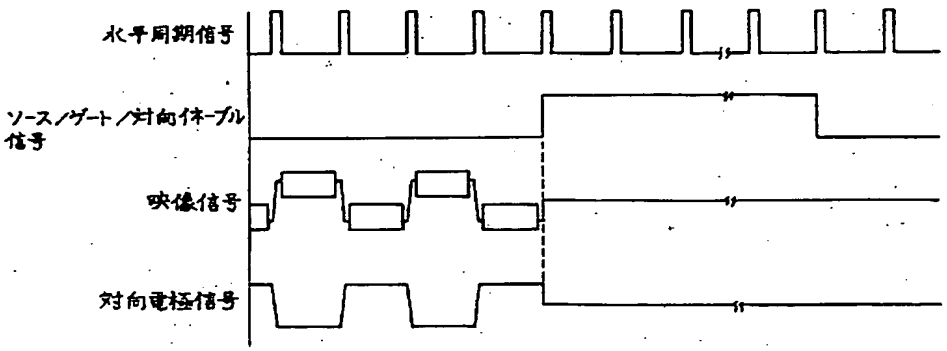
[Translation done.]

Drawing selection Drawing 17



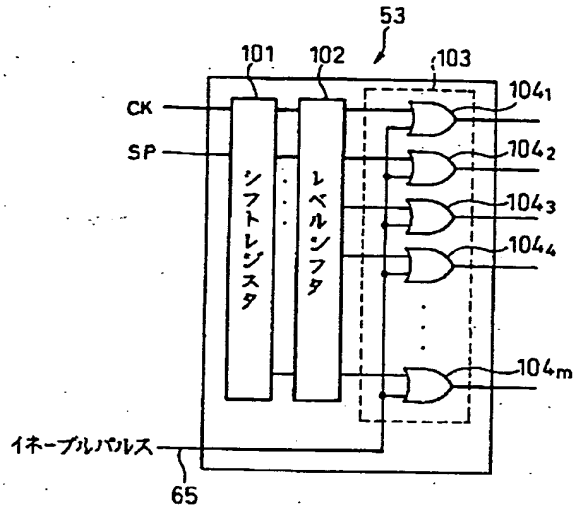
[Translation done.]

Drawing selection Drawing 18



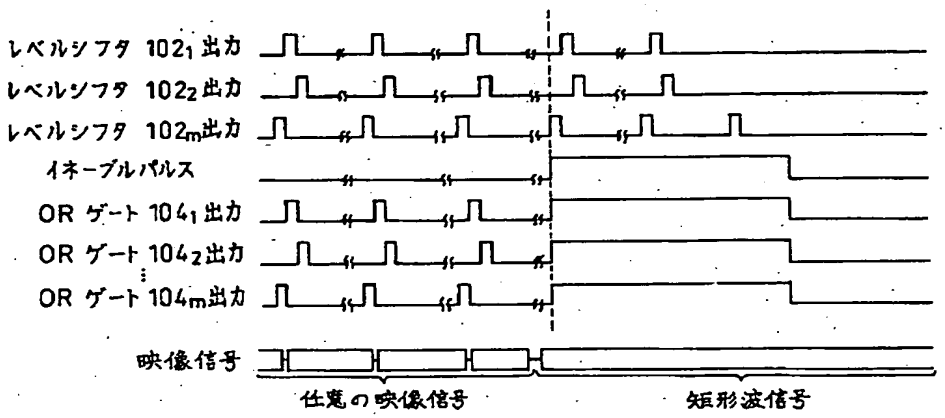
[Translation done.]

Drawing selection Drawing 19



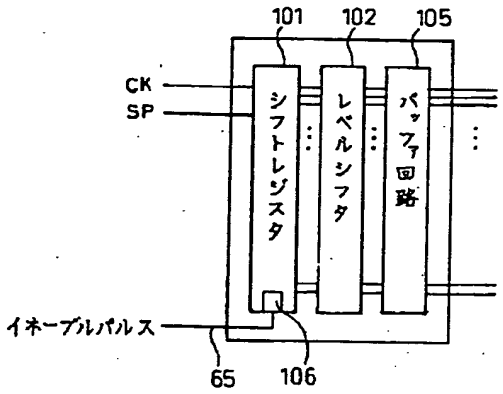
[Translation done.]

Drawing selection Drawing 20



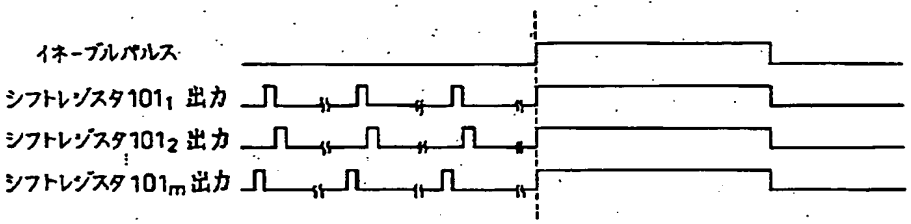
[Translation done.]

Drawing selection Drawing 21



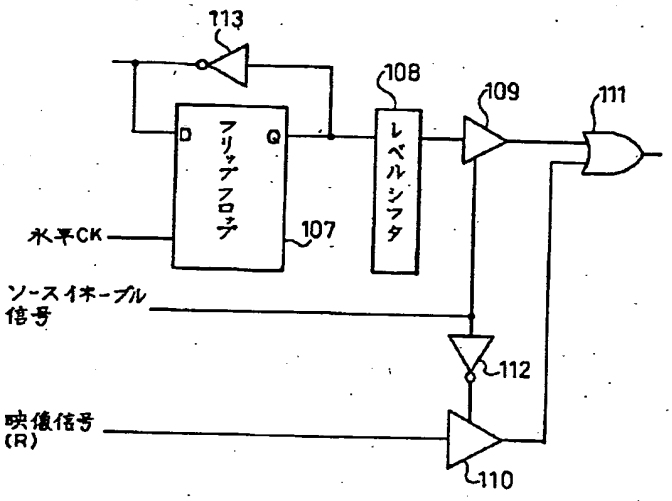
[Translation done.]

Drawing selection Drawing 22



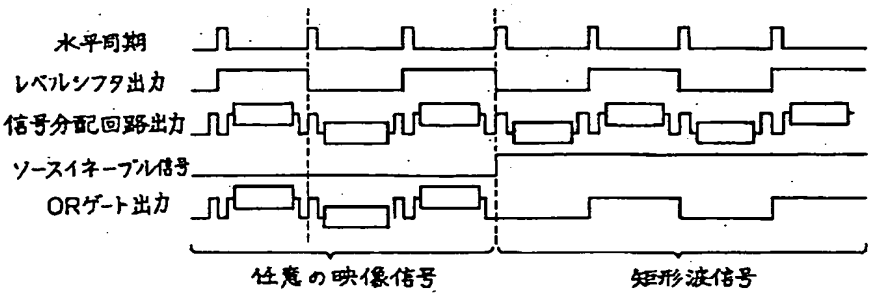
[Translation done.]

Drawing selection Drawing 23



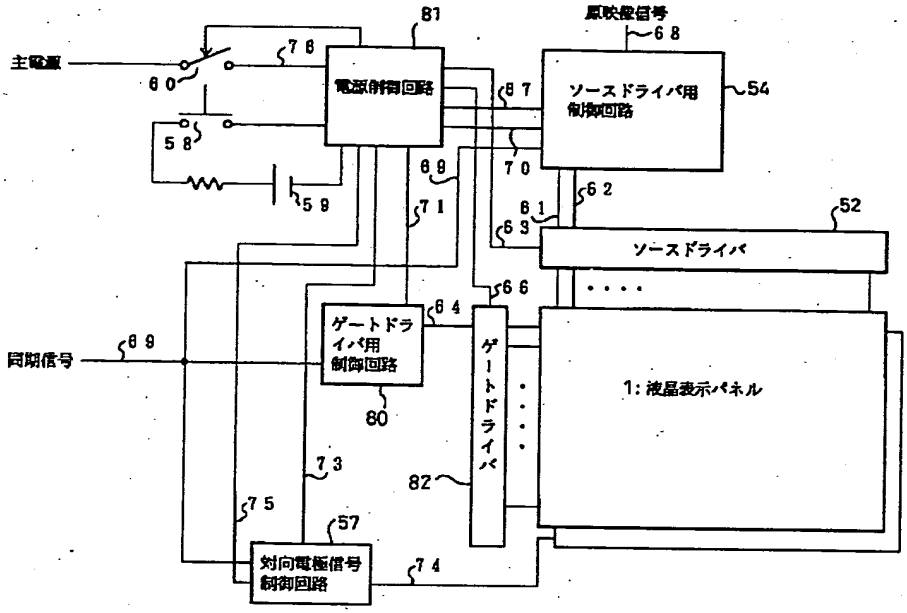
[Translation done.]

Drawing selection Drawing 24



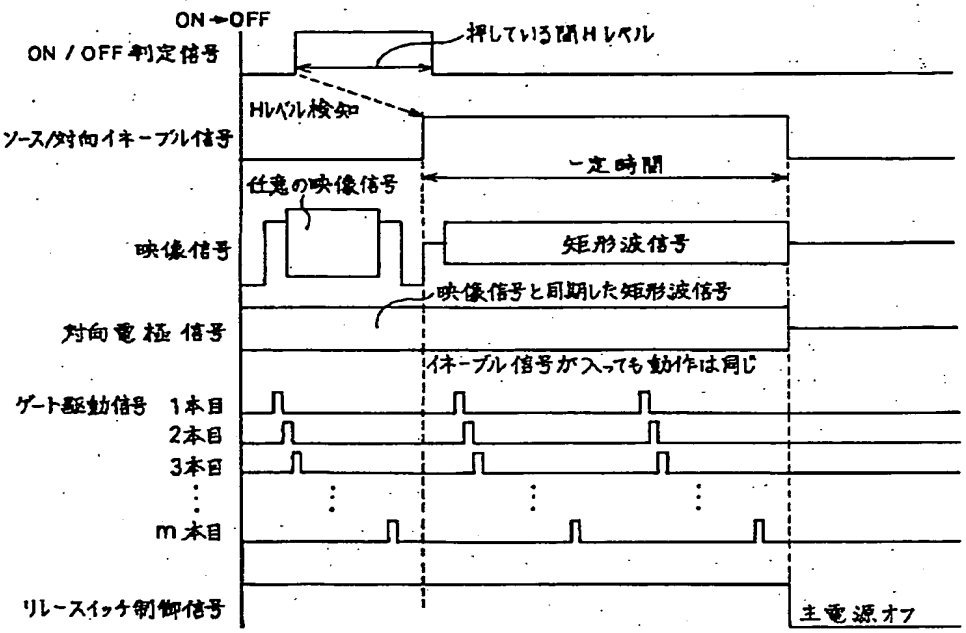
[Translation done.]

Drawing selection Drawing 25



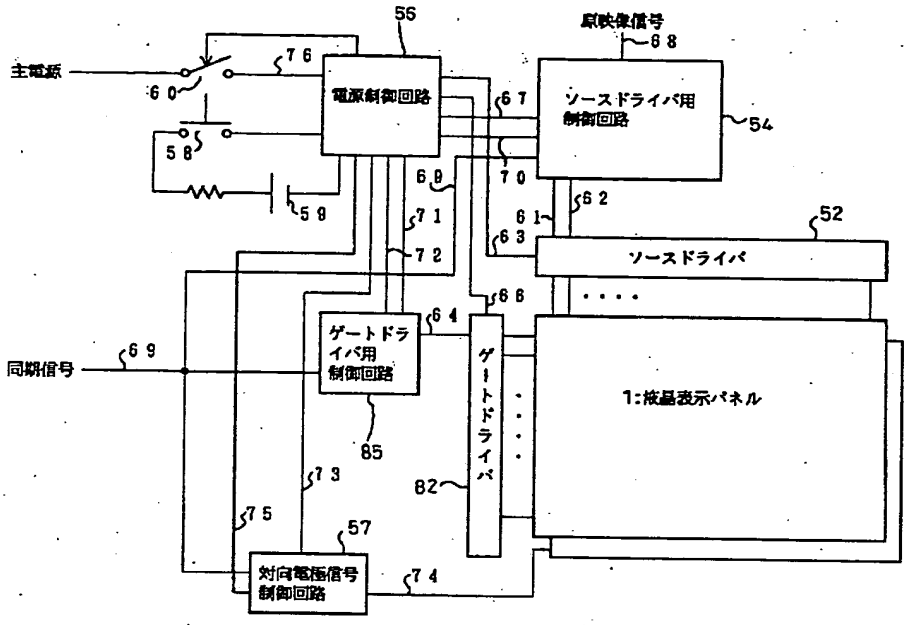
[Translation done.]

Drawing selection Drawing 26



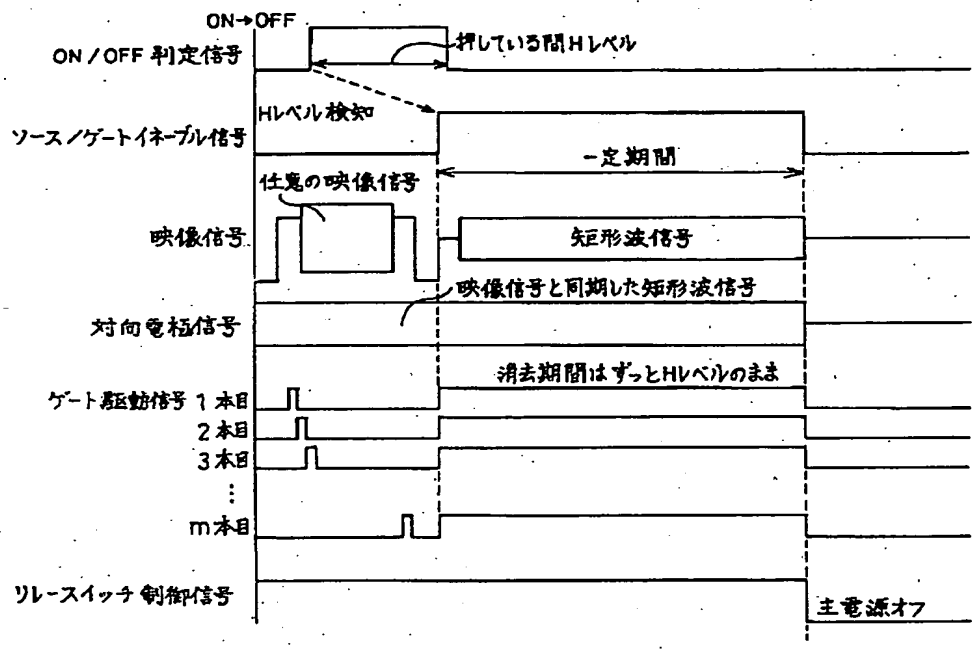
[Translation done.]

Drawing selection Drawing 27



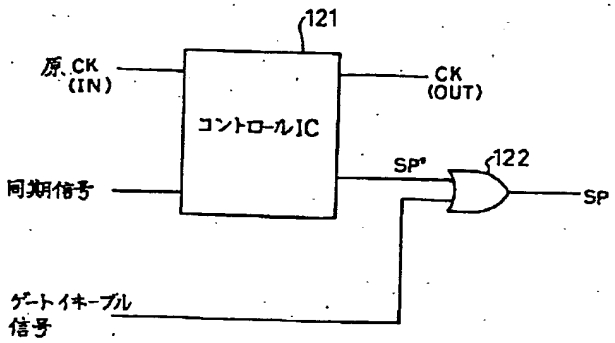
[Translation done.]

Drawing selection Drawing 28



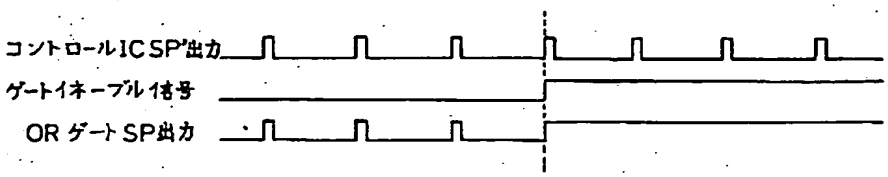
[Translation done.]

Drawing selection Drawing 29



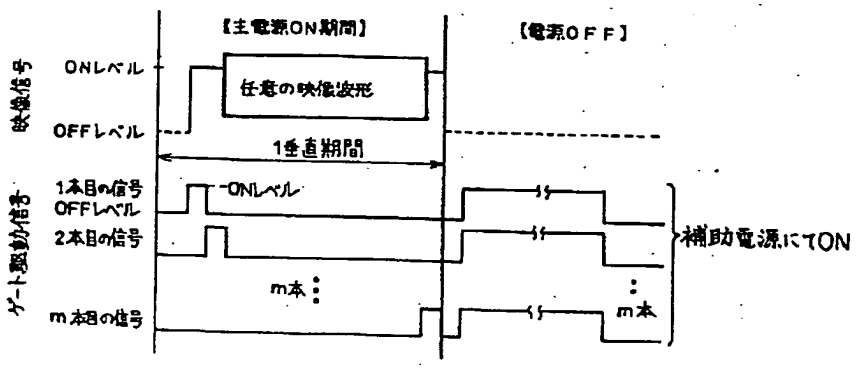
[Translation done.]

Drawing selection Drawing 30



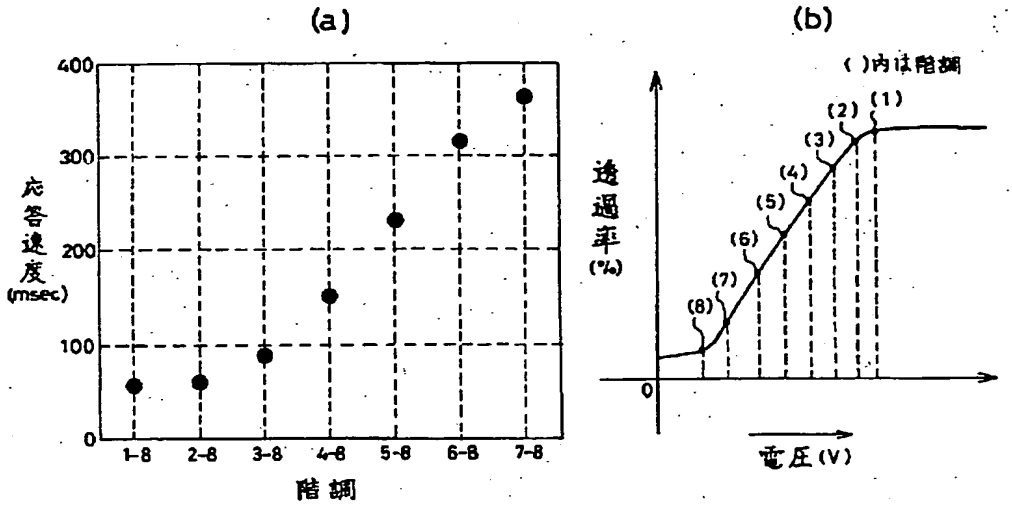
[Translation done.]

Drawing selection: Drawing 31



[Translation done.]

Drawing selection Drawing 32



[Translation done.]